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(I.) AURICULAR FLUTTER.

THE term "auricular flutter" was first used clinically by Jolly and Ritchie a few years ago, and signifies a morbid condition in which the rate of auricular contraction is extremely rapid. Auricular flutter was first induced experimentally by MacWilliam in 1887, and it is now recognised as a not uncommon clinical condition. Attacks of auricular flutter probably account for the great majority of cases of paroxysmal tachycardia with regular rhythm or with pulsus alternans.

Nature and Effect of Auricular Flutter.

As already noted, the contractions of the auricle are extremely rapid; the rate may range from 180 to 380, perhaps being usually between 280 and 300 per minute. The ventricular rate varies considerably in different cases, this depending upon the auricular rate and the ability of the auriculo-ventricular bundle to receive and transmit impulses sent by the auricle. Excepting in rare cases, each systole of the ventricle is the result of a stimulus for contraction received from the auricle in the normal fashion; rarely complete heart-block is present, as in the first case recorded by Jolly and Ritchie. In the vast majority of cases the ventricle does not respond to each auricular contraction, partial heart-block being present. There is usually a definite ratio between the auricular and ventricular rate, this varying from 5:1 to 2:1; it would appear that the order of frequency is 2:1, 4:1, and 3:1. There may be a sudden and abrupt change from one ratio to another. In some cases the response of the ventricle to auricular contraction is at irregular intervals, instead of being in definite ratio with this—this giving rise to irregularity of the pulse rhythm.

The commencement and termination of auricular flutter are sudden and abrupt. The duration of the condition varies in different individuals, as well as in different paroxysms occurring in the same individual. Auricular flutter may persist for only a few minutes or hours, and may never return; or it may last for days, weeks, or even for years, recurring at intervals. It may be succeeded by the normal rhythm, or in many instances it is followed by auricular fibrillation. I have seen the latter occur during the administration of digitalis, but it may also occur apart from the use of the drug. There may be alternation of auricular flutter, the normal rhythm, and auricular fibrillation, the change taking place with the greatest abruptness and suddenness, and occurring from day to day, or even every few moments, one or other condition ultimately becoming permanently established. Sometimes auricular flutter may persist, but, as the result of the occurrence of partial heart-block, the ventricular rate may diminish, and this may take place during the administration of digitalis or apart from the use of this drug. When once a patient has suffered from an attack of auricular flutter there is a tendency to its recurrence from time to time.

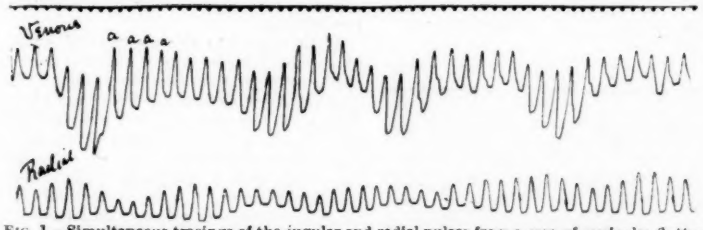

FIG. 1.—Simultaneous tracings of the jugular and radial pulses from a case of auricular flutter in which the ventricle responded to each auricular contraction. The rate is 188 per minute.

The effect of auricular flutter on the heart depends upon the ventricular rate and the integrity of the myocardium. When the ventricular rate is rapid and the myocardium is considerably damaged the condition produces a marked effect upon cardiac efficiency, frequently resulting in cardiac dilatation, dropsy, and other indications of heart failure.

Etiology.

It is yet too early to speak with certainty of the etiology of this condition; possibly this is much the same as that of auricular fibrillation. The condition appears to be most common in advanced age, but has been found as early as five years of age. It seems to be of much more frequent occurrence in males than in females. In all probability auricular flutter is most commonly associated with myocardial degeneration. Not infrequently mitral stenosis is found to be present, while in some cases there is a history of rheumatism; the condition has also been met with during the course of some of the acute infectious diseases.

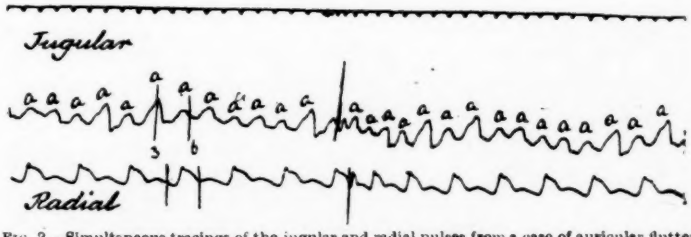

FIG. 2.—Simultaneous tracings of the jugular and radial pulses from a case of auricular flutter with 2:1 heart-block. The rate of the auricle is 186 per minute.

Symptomatology.

The symptoms after the onset of auricular flutter may come on gradually or rapidly, and the patient may or may not be conscious of the change in the cardiac action. He may complain of palpitation, but otherwise there may be an entire absence of subjective symptoms, this depending upon the ventricular rate, the degree of integrity of the myocardium, and the duration of the condition. If the myocardium is fairly healthy and there is not much increase in the ventricular rate there may be for some time only a moderate degree of dyspnœa or other indications of cardiac distress on exertion; if, however, the rate of ventricular contraction is much increased the efficiency of the heart is apt to be greatly impaired; while if the integrity of the myocardium is considerably involved and the ventricular rate is rapid such indications of cardiac failure as cardiac dilatation and dropsy are apt to supervene.

Taking into consideration all cases of auricular flutter, in a majority in which the condition has existed for some time, the ordinary symptoms of cardiac failure supervene; or, if these were present before the onset of auricular flutter, they increase in severity, until ultimately indications of extreme cardiac failure may appear. When the ventricular acceleration is marked, as the amount of blood propelled from the ventricle at each systole is so small as to give rise to cerebral anæmia, the patient may complain of vertigo, and there may be from time to time attacks of faintness or even complete loss of consciousness. Cheyne-Stokes' respiration is also not an infrequent symptom when the condition has lasted for some time.

The rate and rhythm of the arterial pulse may vary greatly in different cases and, it may be, at different times in the same case. If the ventricle responds to each auricular contraction the ventricular rate is exceedingly rapid, and graphic methods are necessary to determine it. In the vast

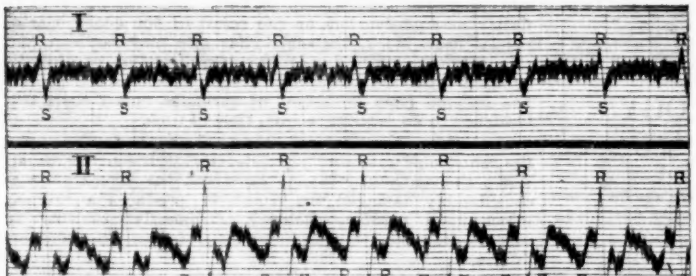

FIG. 3.—Electrocardiogram from a case of auricular flutter with 2 : 1 heart-block. The rate of the auricle is between 320 and 330 per minute.

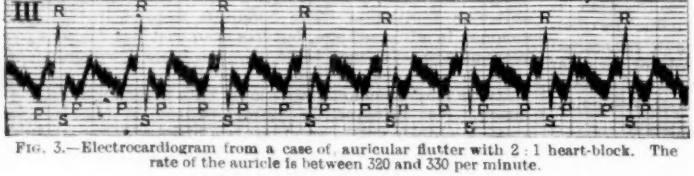

FIG. 4.—Electrocardiogram from a case of auricular flutter with 2 : 1 heart-block. The rate of the auricle is about 300 per minute. There is also left-sided preponderance.

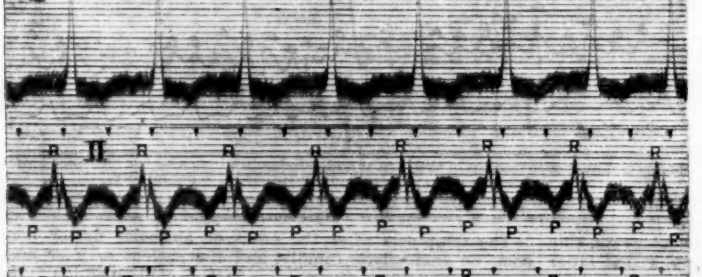

FIG. 5.—Electrocardiogram from a case of auricular flutter before the administration of digitalis. The rate of the auricle is about 340 per minute and there is 2 : 1 heart-block.

majority of cases, however, partial heart-block is present, and as 2 : 1 rhythm is the most usual a ventricular rate of 140–150 is frequently met with. In other cases of partial heart-block the ventricular rate may not be much increased, and, indeed, there may even be bradycardia, as in 4 : 1 or more partial heart-block, as well as in complete heart-block. When there is a constant and uniform ratio between the auricular and ventricular rate the rhythm of the arterial pulse is regular; in these cases, however, if the ventricular rate is above 150 pulsus alternans may be present. When, as is not infrequently the case, the response of the ventricle to auricular contraction is at irregular intervals (lead II. of Fig. 6 and Fig. 9) there is irregularity of the pulse rhythm, it may be even markedly so; indeed, in some of these cases the sphygmogram may resemble that from a case of auricular fibrillation, detailed measurements being necessary for the purpose of differential diagnosis.

On inspection of the neck the jugular veins may be distended and no pulsation visible or extremely rapid movements may be evident in them.

Evidences of cardiac dilatation, as, for example, enlargement of the area of percussion impairment, may be found. If murmurs of mitral disease were present prior to the onset of auricular flutter they may become faint or almost disappear if the ventricular rate be greatly accelerated; this applies particularly to the case of a mitral presystolic bruit.

Polygraphic tracings differ in outline according to whether the ventricle responds to each auricular contraction or to the degree of heart-block which may be present. In the former case there is usually a single wave (Fig. 1). When the ventricle responds alternately to the auricle there are two *a* waves to each ventricular beat, and these usually fall within the limits of ventricular systole (Fig. 2). In 3 : 1 rhythm the character of the jugular pulse may be seemingly that of normal cardiac action, and it is particularly in these cases that an electrocardiographic examination is required to establish the diagnosis. As has been already noted, complete heart-block is rarely found.

With regard to the electrocardiograms of auricular flutter it is of especial importance to analyse the three leads (Figs. 3–9).[1] The auricular deflections may range from 180 to 380 per minute. They are rhythmic in all leads, and in each lead of any given case are almost invariably of constant form. In lead I. their amplitude is comparatively small. In leads II. and III. their amplitude is greater, and they are frequently either diphasic or inverted. The relative number of ventricular complexes depends upon whether the ventricle responds to each auricular contraction or to the degree of auriculo-ventricular block which may be present. The ventricular deflections are of normal form, as they are of supraventricular origin.

Diagnosis.

The diagnosis of the condition rests on the detection of the extremely rapid con-

[1] Some of the electrocardiograms are from cases kindly sent to me for electrocardiographic examination by Sir James Mackenzie, to whom I wish to express my thanks.

tractions of the auricle, and this is not infrequently impossible without the employment of the polygraph or electrocardiograph; indeed, in some cases a correct diagnosis cannot be made with certainty, even though the polygraph be employed, an electrocardiographic examination being necessary. In this connexion it should be noted that it is necessary to distinguish the electrocardiograms of auricular flutter from those of auricular fibrillation. (Fig. 10.) In the case of the latter, however, the *R* deflections occur at irregularly irregular intervals; the amplitude of the *R* deflections varies from cycle to cycle; and there is often no relation between the length of a pause and the amplitude of the deflection *R* which follows it—i.e., a short pause may be followed by an *R* deflection of large amplitude and a long pause by one of small amplitude. In the case of auricular flutter it will be found that these features are not present, even though the ventricular rhythm is markedly irregular. Further, the deflections due to auricular systole in cases of auricular flutter may be distinguished from the oscillations that are found in auricular fibrillation. In the case of the former they are less frequent, ranging between 180 and 380 per minute, rhythmic, and of constant form in each lead; whereas in the latter they are more numerous, irregular in rhythm, inconstant in form in each lead, and smaller in size.

Whenever an individual is conscious of a marked increase in the cardiac rate or complains of attacks of palpitation, occurring suddenly and without apparent cause, or suffers from dyspnœa on exertion and other indications of cardiac failure coming on rapidly we should consider the possibility of auricular flutter, especially if the rhythm of the pulse be regular.

Auricular flutter should be diagnosed from tachycardia associated with a normal rhythm. In a polygraphic tracing of the latter the *a* wave is superimposed upon the *c* wave of the antecedent cardiac cycle, because of the shortening of the ventricular diastole due to the greatly increased frequency of the cardiac rate. In these cases if a presystolic bruit, *due to auricular systole*, be present it disappears; it should, therefore, be remembered that marked pulsation of the jugular veins and a disappearance of a mitral presystolic bruit in cases in which there is great exaggeration of the ventricular rate are not necessarily indicative of the supervention of an abnormal rhythm. If the tachycardia be due to an abnormal rhythm and if the ventricular rhythm is regular the case is probably one of auricular flutter; while if the rhythm is irregular it is necessary to consider whether the case may not be one of auricular fibrillation. In this connexion, if a sphygmogram from a case of auricular flutter be carefully studied it will be found that even though the ventricular rhythm is markedly irregular the pulse-beats measure out into groups of equal length, whereas this is never the case in auricular fibrillation. The polygraph and electrocardiograph are of notable assistance in the differential diagnosis of the two conditions. The diagnosis of auricular fibrillation with a markedly exaggerated

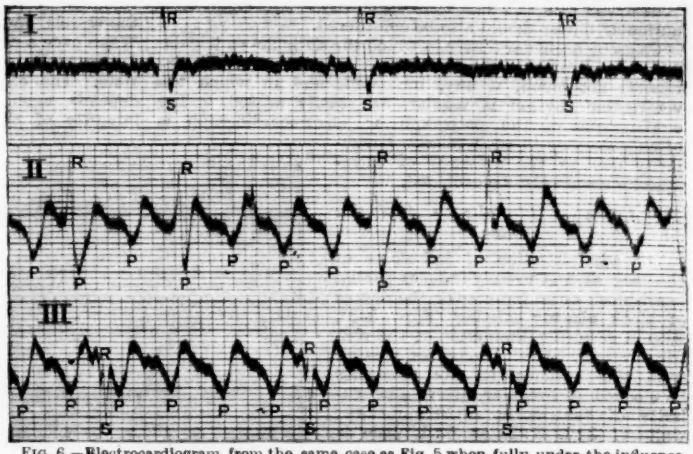

FIG. 6.—Electrocardiogram from the same case as Fig. 5 when fully under the influence of digitalis. There is an increase of the degree of heart-block, with a resulting diminution of the ventricular rate. In leads I. and III. there is continuous 4 : 1 heart-block and in lead II. there is alternate 4 : 1 and 2 : 1 auriculo-ventricular rhythm.

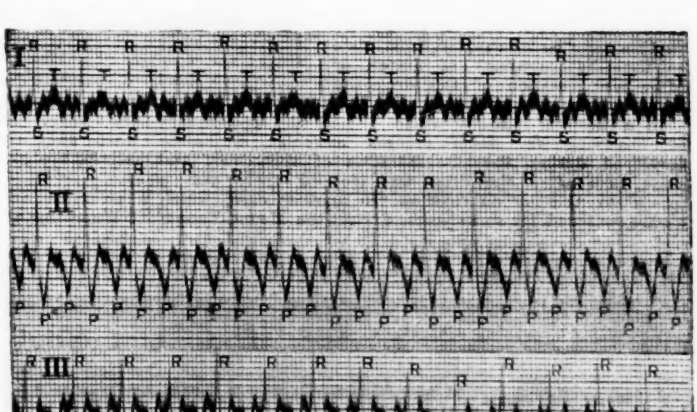

FIG. 7.—Electrocardiogram from a case of auricular flutter before the administration of digitalis. The rate of the auricle is about 280 per minute and there is 2 : 1 heart-block.

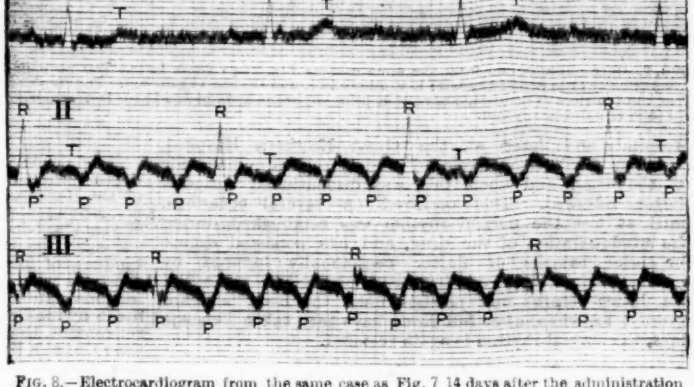

FIG. 8.—Electrocardiogram from the same case as Fig. 7 14 days after the administration of full doses of digitalis. There is an increase in the degree of heart-block, the auriculo-ventricular ratio being continuously 4 : 1.

ventricular rate in which the irregularity is only slight from auricular flutter should also be considered.

Cases of auricular flutter in which the auriculo-ventricular ratio is constantly 3:1 to 4:1, so that the ventricular rate is not much, if any, increased, and in which the ventricular rhythm is regular, are easily missed. The employment of the polygraph or electrocardiograph is often necessary in such cases. Irregularity due to the presence of extrasystoles should also be excluded.

The Action of Digitalis on Auricular Flutter.

The administration of full doses of the drug at first usually induces partial heart-block or an increase of the degree of block already existing (Figs. 5–8), with a resulting diminution of the ventricular rate. If the impulses passing from the auricles to the ventricles be blocked at irregular intervals irregularity of ventricular rhythm results; while if 2:1, 3:1, or 4:1 ratio is induced the rhythm is regular. Later on the drug may induce auricular fibrillation. This may persist or the physiological rhythm may be restored—either event occurring during the administration of the drug or after it has been discontinued—or the normal rhythm may be interrupted from time to time by paroxysms of flutter, or after the cessation of the drug the flutter may return and continue.

FIG. 10.—Electrocardiogram from a case of auricular fibrillation.

In a hospital patient whom I had the opportunity of observing for some months auricular fibrillation developed during the administration of the drug, and some time after the drug was stopped there was a return to the normal rhythm. In another case, which I have watched for some years, first at the Mount Vernon Hospital and later at the Great Northern Hospital, auricular fibrillation developed during the administration of the drug, and when this was discontinued auricular flutter returned. This occurred on several occasions, until at last the normal rhythm was established during the administration of the drug, and has persisted except for brief attacks of flutter occasionally induced by exertion; while if the administration of digitalis is stopped the flutter returns and persists until the drug is again resorted to, when, after full doses have been taken for some days, the normal rhythm is again restored.

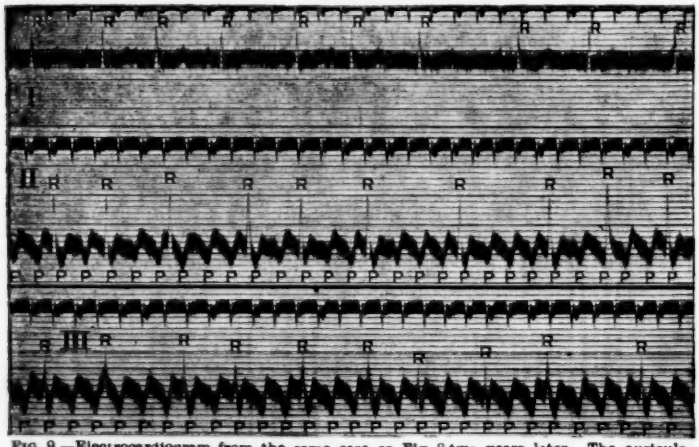

FIG. 9.—Electrocardiogram from the same case as Fig. 8 two years later. The auriculo-ventricular ratio is sometimes 2:1, at others 3:1, and at others again 4:1. The response of the ventricle to auricular contraction being at irregular intervals there is irregularity of the ventricular rhythm.

Prognosis.

The prognosis of auricular flutter depends upon the frequency and duration of the attacks, the ventricular rate, the condition of the valves, the myocardium, and the vessels, and the results of the administration of digitalis. When once a patient has suffered from an attack of auricular flutter there is a tendency to its recurrence from time to time. The effect which an attack has upon the heart depends upon the ventricular rate and the degree of integrity of the myocardium; these have been already dealt with. Attacks of loss of consciousness, especially when they occur in the subjects of marked cardiac failure, are attended with danger.

Treatment.

When the attacks are transient absolute rest is advisable and the treatment is that of paroxysmal tachycardia. When they are of longer duration or the condition has become permanently established one of the digitalis series of drugs should be administered in large doses. We may employ the tincture of digitalis, commencing with a drachm, or in urgent cases with even 1½ or 2 drachms, per diem. These doses should be continued until the full physiological reaction is obtained. After this one of two plans may be adopted: (1) The dosage may be lessened, and afterwards the administration of the smallest dose necessary to control the ventricular rate continued in the hope that the flutter may cease; or (2) large doses may be continued, in the hope of inducing auricular fibrillation, after which the administration of the drug is discontinued for some days in anticipation of a return to the normal rhythm. The first plan is generally to be preferred.

Harley-street, W.

THE LATE DR. ALDERSMITH, HORSHAM.—The death occurred, at Carlton Lodge, Horsham, on March 24th, of Dr. Herbert Aldersmith, who retired from the office of resident medical officer of Christ's Hospital in 1913 after 42 years' service. Many old Bluecoat School boys scattered all over the world will remember Dr. Aldersmith. His kindness of heart and friendly interest endeared him to all the boys who came in contact with him, and of his professional skill nothing further is needed than the declaration made by the Orator at the Speech Day on the occasion of his retirement, that there was no healthier school in England than Christ's Hospital. Since his retirement Dr. Aldersmith had resided at Horsham, and for some years had acted as honorary secretary of the cottage hospital there. He was M.B. Lond. and F.R.C.S. Eng., and was 70 years of age. The funeral took place at Itchingfield.

ARMY NEPHRITIS.

BY C. F. COOMBS, M.D. LOND., F.R.C.P. LOND.,
CAPTAIN, R.A.M.C. (T.F.).

THIS paper is an account of personal experience only, and does not pretend to summarise the writings of others. During the six months, January–July, 1917, I was in charge of medical wards at a base hospital in France. In the course of that period I saw and treated 160 cases of nephritis.

Causation.

There is a striking contrast between the incidence of the disease in officers and in men. Only 6 of my 160 patients were officers. Apart from this the most evident predisposing factor is that of age. Five-eighths of my patients were over 30. The influence of season was less obvious. The dates of onset, as far as could be ascertained, were as follows: January in 22 cases, February in 32, March in 23, April in 33, May in 24, June in 22. It is perhaps arguable that the greater incidence in February and April was related to the very cold weather that prevailed in those months, yet some of the worst cases arrived in a batch in the middle of June when it was warm. In 16 cases there was a history of previous renal disease, 13 of them in civil life; 12 gave a history of scarlet fever, and 5 of diphtheria.

There are only two means of discovering the exciting cause of such a disease as acute nephritis. The first, that of direct bacteriological investigation, I did not apply. The second is the inferential method. In the nephritis of armies, as in that of civil life, the onset is generally so insidious as to be unobserved. Such facts as are available, however, seem to me to point towards an infective origin. The first stage of the disease is often marked by fever, a symptom suggestive more than any other of infection. Moreover, it is very common to find the onset of the disease connected with some infective disease, such as influenza, bronchitis, trench fever, gastro-enteritis, boils, tonsillitis, and so on. Finally, in a few cases at any rate, there are at the outset symptoms of irritation of the urinary tract that remind one strongly of those which usher in infection of the renal pelvis and the bladder by *B. coli communis*.

An argument in favour of the infective origin of army nephritis is its close similarity in many essentials with scarlatinal nephritis. Moreover, experience has taught us that diffuse regressive changes in the specialised parenchyma of any organ, especially if associated with inflammatory reaction in the unspecialised tissues of that organ, are practically always due to infective agents which have found a way in by the systemic blood-supply. The only alternative hypothesis is that of some toxic agent, endogenous or ingested, and there is no evidence which points to the operation of any such agent in army nephritis. On all these grounds I am disposed to argue in favour of an infective origin for this disease.

Nature of Infection.

The next point is to determine whether any particular infection is to be blamed. That disease which comes most nearly into this category seems to be trench fever. (It may be retorted that no one has yet proved that trench fever is a specific infection. Yet the probabilities are so great that one may assume that it is so, even though the actual virus is not yet definitely known.)

Of my 160 cases there were 24 in which some relation existed between trench fever and nephritis. In several of these acute nephritis developed during the course of trench fever, after the patient's admission to hospital for the latter disorder. In others this order was reversed; the patient came in for nephritis, and developed new or recrudescent trench fever. In others, again, the two diseases ran side by side, and it was impossible to say which had preceded the other. In one or two such recrudescences of fever were shortly followed by exacerbations of the renal symptoms. That trench fever, or rather its causal agent, is capable of inflaming the kidneys is suggested by some other cases (not included in the present study) where symptoms of renal irritation, such as dysuria and frequency of micturition associated with transitory albuminuria, manifested themselves for a day or two in the course of a trench fever.

It cannot, however, be argued that trench fever is an essential cause or accompaniment of army nephritis. The percentage of my patients (15 per cent.) in whom there was some evidence of trench fever is not much higher than that of trench fever in many "healthy" units on active service. Conversely, the percentage of trench fever cases in which there is evidence of any renal complication is also very small indeed. The most that can be claimed for the virus of trench fever is that it does occasionally seem to sting the renal tissues into an inflammatory state.

In 18 other cases the nephritis apparently followed an influenzal infection, but this does not represent the close connexion between acute respiratory infections and renal changes at all fairly. In no less than 84 of the cases there was some bronchitis. In 21 others signs of a type of consolidation to be discussed presently were noted. So that there is some association between respiratory infection and nephritis in a majority of cases of the latter. What is the nature of that relation? Is it a coincidence, or does either lesion cause the other?

In the majority of these cases the bronchitis is apparently secondary to the nephritis. It begins after the renal lesion is well under way and disappears after a few days' rest in bed, the urinary changes and other nephritic symptoms still persisting. In such cases it seems fair to assume that the bronchial infection complicates but does not cause the renal disease. Note also the marked seasonal incidence of the bronchial infections and its absence from the causation of nephritis.

At the other end of the scale are very severe cases of bronchial infection, in which the urine is found to contain albumin and even a few casts. There is, however, no œdema, and the circulatory changes which are so characteristic of army nephritis are wanting. Post mortem one finds the bronchi choked with pus, and the bronchial mucosa changed into a wide area of suppuration. Under these circumstances, it is not surprising to find intense and almost universal degeneration of the tubal cells in the kidneys. Such findings do not constitute a nephritis in the ordinary sense of the term. The renal lesions are not the most important; they are not chiefly responsible for the man's illness and death; they are entirely secondary to the very severe infection of another vital tissue, which has killed him.

Between these extremes lie many cases in which the two lesions, renal and bronchial, are in partnership; but it is impossible to say which is the senior. Here we are obliged to fall back on analogy. One of the characteristics of the infective diseases to which the soldier is subject is that they do not come singly. And this is probably the explanation of the association of bronchitis with nephritis. It is a coincidence. Two different infections have been admitted to the body under conditions which have predisposed equally to both. Then they play into each other's hands. The fact of renal injury being present lowers the patient's resistance to the bronchial infection, and conversely the toxins formed by the micro-organisms in the bronchial mucosa attack the renal epithelium and aggravate its troubles.

Further examination discovers a number of infective lesions as preceding nephritis.

In some cases the first thing the patient went sick for was staphylococcal infection of the skin, in another tonsillitis, in several gastro-enteritis of non-specific type. In one case of mine a man was admitted with a tentative diagnosis of pulmonary tuberculosis. He had had slight hæmoptysis and his temperature was raised. From the subsequent course it was possible absolutely to exclude the diagnosis of tuberculosis, but while in hospital he began passing blood in the urine. Casts appeared soon after and continued to appear for over a week. No other nephritis symptoms developed. In this case the renal injury was apparently a consequence of some infection of unclassifiable type.

To sum up, nephritis may apparently be provoked, or at any rate aggravated, by a number of infective agents, but it cannot be ascribed to any special one of those prevalent among the armies in France.

Is there any evidence of its being due to some specific infective agent hitherto undiscovered? If it were so one would expect to find some sign of epidemicity, or at least of endemicity, in certain areas.

As to the first point, in one ward there was for six months a continual stream of nephritis cases, and yet I never saw the disease develop in any single one of the other patients except where it was equally readily accountable for as a complication of that disease for which he had been originally admitted. One sister, it is true, did develop nephritis while on duty in that ward, but she was the only one out of, say, two score people who worked there for some part of the same period of six months. And another sister in the same unit who had nephritis soon afterwards had never worked in the nephritis ward. As to endemicity, my patients came for the most part from the front line, but from all parts of it. I could never trace any particular incidence in any special part of the line, or any individual unit.

This series of cases, therefore, supplies no direct evidence in favour of a hitherto undiscovered specific agent as the cause of army nephritis. Among the cases most like it in civil practice—cases of acute and chronic parenchymatous nephritis in adults—it is possible to point with reasonable certitude to some infective lesion, such as tonsillitis, in, say, 30 per cent. In the remainder one is compelled to rely upon analogy only for one's argument that they also are of infective origin. So that it seems likely that army nephritis, like civil nephritis, is caused by a number of different infective agents, some of them definable, but the majority not so as yet.

Greater Incidence of Nephritis in the Army.

There is, however, a point of contrast between civil and army nephritis which, if examined, may help towards a more definite hypothesis of the causation of the latter—namely, the very much greater incidence of nephritis in the Army, which is many times higher than in the civil population.

There must be reasons for this. One factor, no doubt, is some kind of special sensitiveness on the part of the renal tissues. Valuable evidence is supplied by Dixon,[1] who found some albumin in the urine in 21 per cent. of the patients admitted to a field ambulance.

[1] THE LANCET, 1917, i., 951.

In a large fraction this was transitory, and independent of the affection for which the patient was admitted. But it is strong evidence of a peculiar liability to renal lesions, a liability far greater than that of the civil population. In out-patients in civil practice the incidence of albuminuria is nearer 2 than 20 per cent.

Can one find any explanation of this renal susceptibility? Of my own series, 88 per cent. of the men came from the trench area, while of the 12 per cent. from the lines of communication a majority came either from forestry and other camps where conditions are not much more comfortable than at the front, or from convalescent camps to which they had been sent shortly after coming down from the front. Only two or three of the men had been in "soft jobs." It seems, therefore, that the exposure and fatigue which are the chief features of life in the trench area must pay a large part in rendering the kidneys sensitive to bacterial injuries. The exact *modus operandi* is too speculative a matter to be worth discussing here, but for one or two reasons fatigue seems to be more likely to play a leading part than does exposure.

There is perhaps one other factor at work in the Army making nephritis a commoner disease than in the civil population, and that is liability to blood infections. It is, of course, a truism that this liability exists in regard to the enteric group, dysentery, purulent bronchitis, and other recognised infections. The great frequency of staphylococcic infections of the skin in the Army also may serve as an instance, for these lesions often provide a portal of entry for what may afterwards become a serious blood infection. I saw in the same six months' work seven examples of generalised staphylococcic infection of a gross type, with formation of deep abscesses, arising from boils or carbuncles in three cases and from an alveolar abscess in a fourth. If these gross blood infections of ill-defined type are commoner in the Army than in civil life, probably the less obvious types are similarly commoner. Such infections of the blood-stream by relatively small numbers of cocci or other organism, sometimes arising from an obvious source, sometimes not, might well be responsible in many instances for the initiation of a nephritis.

I am therefore inclined to ascribe the greater incidence of nephritis in the Army as compared with the civil population to (*a*) sensitiveness of the renal tissues, brought about in some way by fatigue and exposure; (*b*) greater liability to the entrance of various infective agents into the blood-stream and thence into the kidneys.

Pathology.

Six autopsies only were made. Sections of the kidneys were kindly cut for me in two instances by Captain R. P. Weldon, R.A.M.C. In three cases the degree of swelling and congestion of the kidneys was extraordinarily intense, and in both the cases microscopically examined the tubal changes were correspondingly severe. Indeed, it seemed as if no normal tubules were left. Both these kidneys also showed signs of glomerular irritation, and this is probably a general rule in view of the intensity of the hæmaturia so often present. Another striking feature was the waterlogged state of the lungs, which exhibited basic hyperæmia and œdema, central collapse, and diffuse purulent bronchitis combined in various proportions.

Putting together all the available evidence, clinical and anatomical, I find myself regarding the disease as provoked in all probability by the passage of micro-organisms or their toxins, or both, through the systemic circulation into a kidney which has been "sensitised" by the trying conditions of military service, especially in men over 30. The fact that so many of these cases clear up quickly suggests that in them at any rate the kidney is only subjected to a limited dose of infection; the bacteria are poured in briskly but for a short time only.

Symptoms.

The usual history given is that of an insidious onset. The man says that he began to feel out of sorts, had severe headache and sometimes vomiting, and that after a day or two of this he noticed his face and ankles swelling. When questioned further he says that the first symptom of all was shortness of breath which came on gradually.

In another smaller class of case the first symptoms are those of urinary irritation, and especially hæmaturia. Micturition is frequent and slightly painful in a few of these cases, but generally what attracts attention is the presence of blood in the urine. In a day or two casts begin to make their appearance, and if the man is up and about he may become œdematous and short of breath. But if he is already in hospital, or is admitted in good time, these systemic symptoms very often fail to develop.

The third group is composed of those patients who are under treatment for some other condition, and in whom the disease is discovered on examination of the urine. In the winter months this was a large group. The men were admitted for bronchitis, and not until the urine was examined and casts found, was the presence of nephritis considered. (Even then, for reasons to be detailed under the heading of diagnosis, one must not accept the presence of casts as equivalent to a label entitled "nephritis.") But not only in cases of bronchitis was nephritis accidentally discovered. One of my patients was admitted for gunshot wounds of the legs and neck; another first came under observation with spastic paraplegia, and so on.

The tongue is often a little furred on admission, and the bowels constipated. The appetite is good. The *pulse* is usually slow, except where quickened by febrile and other complications. On admission the tension is high in about half the cases. For the most part these are patients who exhibit all the symptoms, especially œdema, in a marked degree, or else there is reason to believe that there was some pre-existent renal disease. The pressure falls gradually in the course of a few days in the former group, which is by far the larger. As it falls the other symptoms improve, the œdema lessens, the urinary output rises, and the cardiac physical signs become less pronounced.

In one case only there was a "blood-pressure crisis." Following a febrile attack, which had no obvious cause, this man's blood pressure rose sharply, and urgent cardiac symptoms developed. The heart became dilated and its action rapid and feeble, and as it did so the pressure fell. This patient recovered after venesection, followed by full hypodermic doses of strophanthin.

One other man who died two or three days after admission, partly of bronchitis, partly of uræmia, and partly of cardiac failure, developed an alternating pulse a few hours before death.

Fever is a very interesting symptom in army nephritis. Nearly always it is accounted for by some intercurrent or coincident infection—bronchitis, trench fever, tonsillitis, and so on. But sometimes a man whose symptoms have been following a benign course for some days suddenly develops a rise of temperature coupled more often than not with some recrudescence of his renal symptoms, the most frequent being a fresh outburst of hæmaturia. This probably represents a reinfection of the kidney. Such attacks of fever usually last a day or two only, so that if reinfection is the explanation it must be embolic in type.

Headache was complained of by 64 per cent. of the men as an early symptom. Roughly, its severity and persistence vary with the intensity of the disease. Relapse or exacerbation of the headache, a few days after admission, proved in several instances to be premonitory of uræmia. In one case headache of this type, severe and associated with a persistently hard pulse, was immediately and permanently relieved by venesection. *Vomiting* was a frequent early symptom, especially in severe cases. Its relation to uræmia will be discussed below.

Dyspnœa is a very prominent and interesting symptom. It is, more often than any other, the first form of discomfort which the patient experiences. One finds, however, that those who develop nephritis while in hospital do not become dyspnœic, and as this is also true of œdema I think the two must be in some way referable to a common cause. At this stage the dyspnœa seems to be of the cardiac type, for it depends on exertion for its production, and it is certainly not toxic or pulmonary, because those factors have not reached that pitch at so early a stage. It seems, therefore, as if the toxic bodies of nephritis, whatever they may be, exert some deleterious action on the whole cardio-vascular system, diminishing myocardial contractility, raising arterial tension and increasing capillary permeability; an action which is greatly enhanced if the man be still up and about, putting the stress of rather severe exercise on his poisoned circulatory pump, and as greatly diminished by rest and immunity from strain. At all events, the dyspnœa subsides very rapidly when the man is put to bed, before the blood pressure falls, in fact. Cardiac dyspnœa may also manifest itself later in the case, under circumstances to be described below.

Part of the dyspnœa which is present in the average case of army nephritis is obviously due to pulmonary changes. There is the expiratory distress of bronchitis, so intense in the severe "influenzal" cases of winter and spring, and always proportional to the severity of the lung infection. And there is no doubt a pulmonary factor in the dyspnœa which is seen in nephritis, who, while they have no bronchitis, show signs of œdema at the bases. But, considering how definite these signs are in some cases, the dyspnœa arising from this factor is surprisingly unimportant.

In addition to the cardiac and pulmonary factors there is a third which is happily not often observed in army nephritis—that of uræmic poisoning. In only two of my cases was it at all prominent. Both these men died uræmic and showed very intense inflammatory changes in the kidney post mortem. In both the dyspnœa was of the hissing inspiratory type, and strongly reminded one of the air-hunger of acidosis or the last stage of cholera. In some cases all three factors—cardiac, pulmonary, and toxic—combined to produce dyspnœa.

Œdema was present in seven-eighths of the cases. More than any other symptom it appears to have been this that prompted the patients to report sick. Generally it began in the face and legs, but after the man had been in bed a few days it was much more marked in the lumbar region than anywhere else. In many cases it was present over the whole body when the man was admitted, but the lumbar "cushion" usually persisted for some days after the rest of the body was free from swelling. In severe cases it was accompanied by signs of œdema of the lungs, hydrothorax, and hydroperitoneum. The glottis was probably œdematous in one or two cases, but this never amounted to obstruction of the larynx.

In patients who were œdematous when admitted, the extent and persistence of the swelling constituted a fair index of the general severity of the case. Its absence, on the other hand, seemed to indicate one of two things: either a mild attack in which the œdema had failed to develop or had cleared up in a day or two, or an attack so severe that it ran a fatal course before the swelling had time to appear. Of the six men who died, only one had much œdema, and two had none at all. These two latter were the men whose kidneys proved post mortem to be the most severely inflamed.

In the majority, the œdema cleared up within a few days after admission. The urine output increased, the blood pressure fell, the cardiac signs returned to normal, and the urinary abnormalities became less pronounced, in step with this disappearance of œdema. In about nine-tenths of the cases all swelling had gone within three weeks. The relapses which occurred in a few men were not marked by any exacerbation of the œdema. One interesting point about this swelling was its influence on intercurrent infections. For example, one man with moderate conjunctivitis had a quite disproportionate chemosis, the swollen conjunctivæ projecting between the puffy lids. The same fact was noticeable in a case of tonsillitis, also in the swollen condition round the septic sores that were so common on the legs. It is probable that the lungs reacted in the same way to bacterial irritation, and this accounts in some measure for the severity of the pulmonary complications and the alarming rapidity with which they sometimes develop.

Physical Signs.

The alterations in the cardiac physical signs are characteristic and appear more or less distinctly in a majority. The beat, which is slow and firm, is not displaced as a rule. In a few cases its extent is increased towards the left, but as often as not any enlargement of the heart that may be found is referable to pre-existent cardiac disease. It is the auscultatory signs that are usually altered. The interval between the second sound and the first sound next following—i.e., the diastolic interval—was shortened in about half the cases. The worse the case the more definite the shortening, which, when most fully developed, constituted a tick-tack rhythm, first and second sounds being separated from each other by equal intervals. In two or three days after admission as a rule the normal spacing returns. If the embryocardia persists after this, it means that the case is an exceptionally severe one. More frequent still is a ringing accentuated

second sound. Usually referred to the aortic cartilage, it is nevertheless heard with greatest distinctness at or near the apex in many cases. This accentuation is the most persistent of all the cardiac signs, and often hangs on after the pulse has become soft again. A triple rhythm (bruit de galop), or doubling of the first sound at the apex, was noted in 9 cases, all of them severe but only 1 fatal.

Six cases presented evidences of pre-existent cardiac disease. In four of them this was probably of the cardio-renal type, with hypertrophy and dilatation of the left ventricle, one man had aortic regurgitation of doubtful origin, and one had old rheumatic heart disease with enlargement of the ventricles and signs of aortic and mitral fibrosis. It was interesting to note the effect of the nephritis on each type of lesion.

In two of the men with old ventricular hypertrophy and dilatation a very severe form of cardiac breakdown occurred rather suddenly, in one with premonitory pain over the heart. They became cyanosed, the pulse ran at a great rate, and both appeared dangerously ill, one of them almost hopelessly so. However, they recovered completely.

The man with aortic regurgitation was not much affected. It is probable that the valvular defect was moderate only.

The patient with post-rheumatic disease, however, showed a very interesting phenomenon—dyspnœa out of all proportion to the cardiac defect. This, the hissing type of breathing, the presence of œdema in the back and casts in the urine, brought us to look upon him as having acute nephritis in addition to and independent of his cardiac lesion. This seems to have been accurate, as the dyspnœa, œdema, and urinary changes disappeared more or less altogether, leaving his cardiac signs unchanged.

In a few cases there were systolic bruits at apex or base, or both, without any apparent bearing on the renal lesion. No case of pericarditis was seen.

The *pulmonary* physical signs are of two kinds. There are those which indicate bronchitis, and also those which belong to certain basal changes. In 84 of my 160 cases the bronchitic signs were present and predominant over the basal signs; in 21 the latter were present and predominant over the former. I have expressed it in this way, because so often the two types coincide, and even as it is I have not been able to express in statistical form the fact that the bronchitic signs often prevail at the bases of the lungs. The etiological basis for the existence of these diverse clinical types lies in the fact that there are two factors at work—viz., infection of the bronchi and passive œdema of lungs and pleura. These two combine in every conceivable proportion. At one end of the scale is the purely bronchitic case, similar to those described by Hammond, Rolland, and Shore,[2] and only betraying the renal element by urinary changes and a fatal tendency to an excessive outpouring of serum into the inflamed tissues. Men die in several days of a bronchitis that they might otherwise have successfully resisted, or, at all events, grappled with for several weeks. At the other end are men who are usually very œdematous, and in whose chests there are certain physical signs in the lower lobes—impairment of percussion note, poor air entry with a bronchial quality on deep breathing, alveolar râles, and "bleating" or nasal vocal resonance, especially noticeable over the central part of the affected lobe or lobes. Judging from post-mortem data these signs indicate a combination of passive œdema and hyperæmia with collapse, possibly with some hydrothorax, and with a minimum of the infective factor. Between the two extremes lie all degrees and combinations of the infective and the passive factor. Very often one finds some medium râles over both lungs for a few days, or it may be that at the extreme base there are a few sticky alveolar râles combined with some deficiency of air entry.

Actual pleurisy was not a common complication, but in one boy who died of uræmia the right pleura filled quickly with bloody sero-pus in the last two days of his life.

The *abdominal* physical signs were not important. In several cases of men admitted in a highly œdematous state there was a little dulness in the flanks, and in similar cases the liver appeared to be swollen and enlarged, returned to normal in two or three days after admission. One or two of the men with acute relapses accompanied by dysuria complained for a day or two of tenderness over the bladder, and in one rather similar case there was persistent tenderness over the right kidney.

Urine.

For the first day or two after admission in an average case the output is low, round about 20 ounces a day. About the third day this begins to rise and sometimes goes up steeply in a kind of diuretic crisis, over 100 ounces being passed in some cases on the fourth or fifth day. In others the rise is more gradual, but practically always there is a rise. This increase seems to be independent of treatment, though perhaps it is favoured by saline diuretics, and also by hot-air baths. With relapses the quantity falls again. With the increase in the urinary flow the œdema diminishes. On the other hand, an increased output of urine by no means guarantees the patient against uræmia. Of three men who died uræmic and who proved post mortem to have extremely intense nephritis, every one was passing plenty of urine at the time of death. One boy, whose daily output was below 10 ounces for several days after admission, had increased it to over 60 ounces at the time when he became obviously uræmic, and in three days he was dead. The same was noticed in the non-fatal cases of uræmia; several of them did not develop fits till some days after admission, when they were passing an increased quantity of urine.

Albumin was found in the urine in 153 cases. The salicyl-sulphonic test was used almost throughout for discovering albumin, the cold nitric acid and boiling tests being used when necessary for confirmation. Broadly speaking, the amount of albumin diminishes as the patient improves, but it varies so inexplicably that it cannot be used as a guide in prognosis. In a large majority albumin was still present when the patient was discharged to England after one to three weeks in hospital. In one or two cases, however, patients whose field medical cards showed that albumin had been found at units further up the line, and whose general condition proved beyond doubt that there had been actual nephritis, showed no albuminuria while in hospital. In one or two of these the effect of posture was tested by allowing them up for a few hours without recalling albuminuria.

Blood was found in the urine in 106 cases. Captain W. E. M. Armstrong, R.A.M.C., who made these microscopic examinations, remarked how little blood it took to make the urine smoky. In a few cases the amount of blood present was very remarkable, the urine looking almost like pure blood. This was particularly noticeable in the worst cases and also in some of the relapses. In one of the latter there was so much blood that I thought there must be a papilloma of the bladder, but the subsequent course supported the original diagnosis of nephritis. Of all the urinary changes the degree of hæmaturia is the one which parallels most closely the general course of the disease. As a general rule, therefore, it tended to clear up. In the chronic cases, however, blood continued to appear in the urine most obstinately. In three men, for example, there was still quite a considerable quantity of blood in the urine over a month after admission, and the other symptoms, especially œdema, showed an equal tenacity.

In 104 cases casts were found, usually epithelial and granular. It was remarkable how they came and went without much relation to the general course of the disease, and how urines containing much blood yielded no casts, even to a particularly careful scrutiny. This points to a belief that the glomerular lesions are at least as important and constant as those of the tubules. It is also in contrast with the frequency with which casts were found in the urines of men suffering from various acute infections, especially pneumonia and purulent bronchitis, whose urinary changes were apparently only a side issue from the main stream of the case.

Uræmia.

Uræmic symptoms were manifested in 12 cases. Four ended fatally, but two of these deaths were in part due to concurrent bronchitis. Eight men had convulsions, only one of them dying. There were usually premonitory restlessness and headache, sometimes also vomiting. The number of fits varied from one to five or six. After they had subsided there was usually a period of coma, partly due to the various sedatives employed to stop the convulsions. After the patient emerged from coma he often showed curious alterations of temper, varying from mere childishness to symptoms which in one instance brought the man to hospital with a diagnosis of insanity. In a few other men who developed no distinct uræmic symptoms a morbid irritability of temper was noticed, usually only lasting a day or two. In neither of the men whose deaths were directly uræmic was there any œdema, yet in both cases a most intense nephritis was found post mortem. As already remarked, uræmia seemed most apt to develop when the oliguria present on admission in severe cases had been replaced by an adequate output of urine.

Diagnosis.

In the rush of military work a case of nephritis may easily escape detection. The plan that works best is to have a simple test, such as that with salicyl-sulphonic acid, ready to hand, and to apply it whenever there is the smallest suspicion of the case being one of nephritis. I tried the plan of testing all cases admitted, and found the percentage of possible "oversights" so small as to be negligible.

The other mistake, that of diagnosing nephritis when it is not there, is particularly likely to occur when one is seeing large numbers of nephritis cases, as one does in military hospitals in France. It happens in this way, that albuminuria is looked for and found, say, in a case of lobar pneumonia. The urine is searched for casts, and these also are found. Nephritis being prevalent, one is too apt to assume that this also is a latent case and the pneumonia is a secondary lesion. But unless there are other symptoms of nephritis, such as œdema and the cardio-vascular phenomena described above, it is more correct to regard the pneumonia as the primary lesion and the urinary changes as secondary. They are, of course, important even in a secondary capacity, as indicative of an intense degree of infection. But nephritis ought not to be diagnosed unless there are symptoms, urinary or general, or both, which bring the renal lesions into the forefront of the picture.

Prognosis.

The mortality among these 160 cases was rather high as compared with most series of army nephritis, six (3·75 per cent.) ending fatally.

In four of these cases the nephritis was of an extremely severe type as found post mortem, severe enough to be lethal of itself. In three of these four, however, bronchitis was probably a contributory cause of death, and in the fourth a very acute pleurisy developed as a last phase. In the other two cases death was due as much to bronchitis as to nephritis.

The most dangerous type of army nephritis case is, therefore, that in which evidences of intense nephritis coincide with severe bronchitis. Next to these come cases with intensely severe and ingravescent urinary changes associated with uræmic symptoms, and of all such urinary changes the most significant is free and persistent hæmaturia. Of the uræmic symptoms fits, though alarming enough to the patient, are not so threatening as a rapid passage into coma or persistent vomiting. Only one of the eight who had fits died in uræmia.

A third danger to life lies in the possibility of cardiac failure. Not one of my patients died of this alone, but in one of the fatal cases it was certainly a powerful factor, and two others—men who had probably had cardiac disease before—looked very much like dying at one time. The symptoms which foreshadowed cardiac breakdown were increasing cyanosis, rapid pulse, and præcordial pain. Diminution in the loudness of the first sound at the apex, bruit de galop, and an alternating pulse are also signs pointing in this direction.

It will be impossible to say what is the ultimate prognosis in these cases (how long it will be before complete recovery ensues, what percentage of men will be permanently crippled, what will be the liability to relapse) until some years have gone by.

Practically all my patients were in hospital two or three weeks, and left for England with no bronchitis, little or no œdema, but more or less persistent urinary changes, blood and casts being still present. From experience of similar cases seen in England during the first years of the war my impression is that in a good many these urinary symptoms persist, with a liability to relapse. Two or three of the 160 patients discussed in this paper had already been invalided to England once, some months before, for nephritis. A return to active service conditions very soon provoked a recurrence of the symptoms. Apart from this, relapse may occur after months of latency. Even during the comparatively short time my patients were under observation in hospital 6 out of the 160 had distinct relapses, and others probably escaped notice. It seems from these various data that the outlook as regards final recovery is not quite as good as appears on the surface.

In a few cases the symptoms have shown a most annoying obstinacy, especially œdema and hæmaturia. These patients were generally men who had either failed to report sick soon enough, or who, having reported sick, had been kept at duty until they were too ill to stand. It should be added that widespread skin lesions (scabies, impetigo, &c.) were often associated with a severe type of nephritis.

Treatment.

The first essential is early diagnosis. The sooner a patient with army nephritis gets into hospital the sooner will he be on the way to get well. A very simple routine was used in all my cases. Army Orders left no choice as to disposal; all these men had to go to England. But even if there had been no such orders every man with nephritis would have had to go. Any attempt to get one back to duty of any kind would have been futile and possibly disastrous. Every patient was therefore kept in bed until ready for discharge to England, and was sent home as a stretcher case.

When first admitted, unless his case was a very mild one, he was given a diet of milk, tea, and rice milk, bread and butter, milk pudding, and cocoa. In the course of a few days, as the symptoms improved, fish (6–8 oz. per day) and potatoes (about ½ lb. per day) were added to this. Feeding below this limit did more harm than good, and in one of the uræmic cases it seemed to me that a more generous diet might have staved off the fatal issue. His symptoms were so like the acidosis that accompanies and terminates various types of starvation.

All patients with much œdema were treated with hot-air baths till it subsided. Latterly we used electric bulbs, of the kind belonging to electric radiators, fixed on a cradle covered with asbestos sheeting and lit from the main. This proved satisfactory and safe as compared with the spirit lamp and chimney used before, but rather on the slow side. These baths were given once or twice a day till the œdema had gone. In satisfactory cases it was interesting to see how the use of these baths was followed by increase in the urinary output. Pilocarpine was given in one or two cases only. The patients nearly always sweated profusely without it, so there was no need to give it. No drug was necessary as a routine measure. Saline purges were usually given for a day or two after admission. Various diuretics were tried and carefully watched. Caffeine was of no use; in fact, the only one that seemed to help the output of urine was tartrate of potash, one drachm every four hours, and even here it is possible that the patients would have done as well without it.

As to the various complications, the treatment of cases in which bronchitis complicated nephritis did not differ from that of the two diseases treated separately. In one case, however, acute œdema of the lungs seemed to be threatening the man's life, and atropine sulphate was given freely (gr. 1/50 to begin with and then gr. 1/100 every four hours) till improvement ensued. This apparently saved the man's life.

Lumbar puncture was tried twice in uræmia, but did no good. The best line of treatment seemed to be venesection, with sedatives if fits were troublesome. Chloral and bromide, one drachm of each, given per rectum, sufficed in several cases; in others it had to be repeated, or chloroform had to be used in order to give the enema satisfactorily, while in several either morphia (gr. ¼) or omnopon (gr. ⅓) was given hypodermically as well as the chloral and bromide. No bad effects followed in any case.

Venesection was also of the greatest benefit in those patients who seemed to be in danger of cardiac failure. In two cases it was followed by hypodermic injection of strophanthin in full doses, beginning with gr. 1/100 and gradually decreasing. Both these men looked as if they were going to die, and might have done so if it had not been for the strophanthin and venesection.

I am obliged to Lieutenant-Colonel S. G. Butler, D.S.O., R.A.M.C., for permission to use my notes on these cases; to Sister A. S. MacMillan, T.F.N.S., for much assistance both in their treatment and in keeping records; and to Captain Armstrong for all the urinary examinations.

PROPHYLACTIC TRIPLE INOCULATION AGAINST TYPHOID AND PARA-TYPHOID FEVERS.

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(A Report to the Medical Research Committee.)

THE importance of the prophylactic inoculation of troops against paratyphoid fevers, in addition to their inoculation against typhoid fever, was realised in the early autumn of 1914.[1] As, however, the existing evidence from the work of Castellani,[4 5 8] Cummins and Cumming,[7] and Kabeshima,[11] did not appear to be regarded as conclusive, we began early in 1915 a series of investigations on animals (rabbits) and on man regarding the production of immunity by means of inoculation with triple vaccine (typhoid, paratyphoid A and paratyphoid B). As a part of this work one of us (G. D.) carried out long series of observations on man to determine the detailed form and time relations of the immunity curves for agglutinins following a single or a double inoculation with this triple vaccine. The material was already completed when unfortunately almost the whole of it (along with other valuable data) was lost by fire at a certain place in the early part of 1916.* What has been learned from the experience gained in these observations, however, remains, and formed the basis on which later statements were founded. But in order to produce fresh experimental material in accurate detail new observations were instituted in this department by Mr. Wilburt C. Davison, Rhodes Scholar, both on animals and man. The result of these experiments, which were embodied in Mr. Davison's thesis for B.Sc. Oxon., June, 1916, will shortly be published in an accessible form.

Early Investigations.

Widal and Sicard[2] (1897) were the first observers to investigate the production in animals of multiple immunity. They employed mixtures of *B. typhosus* and *Vib. choleræ*. In the following year their observations were extended, and Widal reported at the Congrès de Montpellier (loc. cit.[3]) experiments with mixed cultures of *B. typhosus*, *Vib. choleræ*, *B. coli*, *B. friedländeri*, and *B proteus* which showed that animals could readily be rendered immune to several different micro-organisms at the same time, and that agglutinins were developed in the serum for each of these micro-organisms.

S. Wolf[3] (1899) two years later also investigated the production in animals of multiple immunity, using mixed cultures of *B. typhosus*, *B. coli*, *B proteus*, and *Streptococcus*. He thus confirmed the results of Widal and Sicard, and pointed out that mixed infections might be diagnosed by means of the agglutinin reaction.

Castellani[4] (1902) repeated these observations, employing various combinations of bacteria—namely, *B. typhosus*, *B. coli*, *B. pseudo-dysentericus* (so-called), and *B. prodigiosus*, one or more together, and confirming previous conclusions. In 1909[5] he continued the investigation of the use of typhoid vaccine and mixed vaccines containing *B. typhosus* with other organisms, and arrived at the following conclusion regarding mixed vaccines—namely, "Mixed vaccines may be prepared by using dead or live attenuated peptone water cultures of typhoid and dysentery, or typhoid-paratyphoid and dysentery. The inoculation of mixed vaccines may be of advantage in some cases, but the subject requires further investigation as regards its efficiency in man." But Castellani did not examine the important question whether the best results could be obtained by mixed inoculation of the different bacteria or by successive immunisation with each organism independently.

The observations of Jörgensen[6] and others on animals, however, show that in *successive* immunisation with bacilli of the typhoid-colon group the immunity evoked against those organisms which are injected later in the series is less than the immunity obtained when they are mixed together and injected *simultaneously*, unless a considerable time is allowed to elapse between the inoculations with the different bacilli. And this result is independent of the order in which the different organisms are employed. Jörgensen was the first observer to study the curves of agglutinin formation after inoculation with mixed cultures by accurately quantitative measurements repeated at short intervals of time.

* The present communication was originally written in December, 1916. It has been held back hitherto in the hope that certain data saved from the fire might become available for publication. But in the continued absence of access to the data in question it has been thought desirable to publish our conclusions without more delay.

Typhoid-Paratyphoid Inoculation.

In 1913 Cummins and Cumming,[7] as the result of careful observations on protective inoculation against typhoid and paratyphoid A fever in man, found that paratyphoid A vaccine given in two doses of 500 and 1000 million bacilli respectively at an interval of 12 days did not give rise to any severe reaction. They also showed that a mixed emulsion of *B. typhosus* and *B. paratyphosus A* in similar doses gave rise to a reaction not appreciably more severe than that following antityphoid inoculation.

Later in the same year Castellani[8] dealt further with the question of typhoid-paratyphoid inoculation in man, and stated that five years' experience in Ceylon led him to the conclusion that the results obtained with mixed vaccine in man were good. The evidence which he then published regarding the actual development of immunity in triple inoculated subjects as gauged by their production of agglutinins only extended to four individuals inoculated in June, 1913, and followed for the succeeding 15 weeks. In these four individuals the agglutinin titre obtained was at no time high, and had already fallen to a very low level by the thirteenth week. Nevertheless, the titre reached for each individual bacillus in triple inoculated persons was at least as high as that found in subjects inoculated with only one of these bacilli in the same dosage.

In 1914 Kabeshima[19] published evidence, both from animal experiments and from extended observations carried out on the personnel of the Imperial Japanese Navy, of the great protective value as well as the innocuous character of the triple vaccine. Kabeshima used in man a vaccine containing *B. typhosus*, *B. paratyphosus A*, and *B. paratyphosus B* in equal numbers. He states that 1 c.cm. of the vaccine contained "1 milligramme" of bacilli, and the doses of this vaccine were 1 c.cm. and 2 c.cm., but the number of bacilli per c.cm. is not stated. Kabeshima's results were extremely good as judged by his data, which we have tabulated on a former occasion.[1] But he gave no figures bearing on the duration of agglutinin formation in man, though he states that the agglutinin titre obtained for *B. typhosus* and *B. paratyphosus B* was fairly high, that for *B. paratyphosus A* usually very low. He found, moreover, that while the typhoid titre was usually the highest the protective power of the human immune serum for animals (mice) was greatest against paratyphoid A and B infections.

Investigations Commenced Early in 1915.

Early in 1915[1] we drew attention to the fact that paratyphoid infections were occurring both in antityphoid inoculated individuals and in non-inoculated persons among belligerents, and were likely to occur in increasing numbers. We therefore urged the importance of the use of triple vaccine. We also set on foot a series of investigations in order to provide clearer evidence than had hitherto been offered in regard to a number of points of the greatest practical importance for the use of triple vaccine in man. Among these were:—

1. To make sure that no kind of weakening or curtailment of typhoid immunity resulted from the addition of paratyphoid A and B bacilli to the vaccine.
2. To ascertain whether the same dosage of *B. typhosus* as was used in the single vaccine (antityphoid) could be maintained along with the addition of sufficient paratyphoid vaccines to confer immunity against the latter infections without causing too severe local or general reaction in the inoculated subject.
3. To determine the relation between dosage and
(*a*) The titre obtained.
(*b*) The persistence of agglutinin formation after inoculation.
4. To study the question of the interval to be allowed between the first and second inoculation in order to obtain the best results.

A short account of the results so far obtained was given by one of us (G. D.), with data, in November, 1915.[10] At the same date Castellani and Mendelson[11] published a note on their tetra-vaccine, which contains *B. typhosus*, *B. paratyphosus A*, *B. paratyphosus B*, and *Vib. choleræ*. This vaccine contained 1000 million cholera vibrios per c.cm., in addition to the constituent of Castellani's ordinary triple vaccine—namely, 500 million *B. typhosus* and 250 million each of paratyphoid A and B per c.cm. The dose for both triple and tetra-vaccine is 0·5 to 0·6 c.cm., followed one week later by a second dose of the same volume. A third dose is sometimes given at a further interval of one week, but this is not regarded as essential. These authors give evidence from observations on three cases in which the agglutinin titre of the serum against all four organisms are measured at intervals of a week during the first six weeks after inoculation. The maximum agglutinin titre obtained was uniformly low, except in the case of the typhoid agglutinins.

Other Investigations.

About the same time Harvey and Gibson[12] carried out animal experiments (on rabbits) with mixed vaccines, obtaining their results from *pooled* blood. In addition to confirming the old observations of Wolf, Castellani, Jörgensen, and others regarding agglutinin formation, they also provided several curves illustrating the development of opsonins. Unfortunately, it is the case that different individuals vary so much both as regards the degree of antibody formation and the moment at which its maximum is reached that the chief effect of pooling the bloods from such small numbers of animals was entirely to disguise the true form of the immunity curve.

In May, 1916, Coppinger and Gibson[13] published the results of observations on man which were begun shortly after the discussion on paratyphoid at the Royal Society of Medicine, and in which they made use of vaccines of the same strengths as had been proposed by one of us (G. D.) and employed in our observations. They thus, like ourselves, employed a dosage several times as great as that used by Castellani. In this case, also, their results represent *pooled* bloods tested against saline emulsions of living bacteria. The procedures they adopted probably in great part account for the fact that the shape of their agglutinin curves is entirely different from what we have found in man, and from what a number of previous observers, including ourselves, had found in animals. We dwell somewhat carefully on the history of the use of mixed vaccines, as some of the observers mentioned above have confined their discussion of the subject chiefly to their own experiments.

In France, Vincent claimed to have introduced the use of mixed typhoid-paratyphoid vaccine in 1910. But Widal has shown that this claim could not be substantiated, since even one year after the commencement of the war Vincent had not made use of triple vaccine in the French Army.

In the summer of 1915 Widal himself strongly urged the introduction of the use of triple vaccine on the ground that "la fréquence des fièvres paratyphoide est, depuis tantôt une année, le fait epidémiologique saillant de la guerre."

Our Investigations.

Important points in relation to the use of triple vaccine were clearly—

1. In no way to reduce the dose of the typhoid constituent which experience in the Army had shown to be both necessary and fully adequate for protection, and which had for years given excellent results—namely, 500 million bacilli for the first dose and 1000 million bacilli for the second.
2. To determine the dosage of paratyphoid A and B vaccine which were necessary to secure protection of satisfactory duration and degree.
3. To ascertain whether these quantities of paratyphoid vaccines could be added to the typhoid dosage without producing too severe a reaction (local and general).

We were from the first of the opinion that the doses recommended and employed by Castellani were too small, and of this we very soon became convinced.

Castellani's vaccine contains 500 million *B. typhosus* and 250 million each of *B. paratyphosus A* and *B* per c.cm., and the doses given are 0·5 to 0·6 c.cm. repeated at an interval of one week. He thus gives a total dosage of 500 million to 600 million typhoid bacilli and 250 million to 300 million of each of the paratyphoid bacilli. Thus the total dosage of typhoid bacilli is only about one-third of the dose considered necessary for protection in our Army for years past.

In our own investigations we have used vaccine made up to the following strengths per c.cm.

(i.) 1000 million *B. typhosus*. 500 million *B. paratyphosus A*. 500 million *B. paratyphosus B*.
(ii.) 1000 million *B. typhosus*. 750 million *B. paratyphosus A*. 750 million *B. paratyphosus B*.
(iii.) 1000 million *B. typhosus*. 1000 million *B. paratyphosus A*. 1000 million *B. paratyphosus B*.

These vaccines were given in quantities of 0·5 c.cm. as a first dose and 1 c.cm. as a second dose. The interval between the first and second dose was varied in different cases between 7 and 21 days in order to determine what was the most suitable interval to allow in order to obtain the best results.

The total number of individuals inoculated amounted to several hundreds, and in a number of the cases (about 25) the agglutinin curve for T., A., and B. were followed, at first either daily or at short intervals, and later on (after the first few weeks) at intervals varying from a week to several weeks for a number of months. Besides this a large number of the cases were examined once or twice only at varying times from their date of inoculation.

The degree and duration of the immunity obtained by inoculation was in all cases gauged by the agglutinin titre as being the most readily and most accurately measurable feature of the immunity reaction, though we are fully cognisant of the fact that the final verdict as to the protective value of inoculation must rest on the statistical results regarding incidence, severity, mortality, and duration of disease among inoculated persons as compared with non-inoculated individuals.

Reaction.

As regards the degree of local and general reaction produced by the inoculations we have found that the first and second vaccine do not produce appreciably greater disability than the ordinary typhoid vaccine. And this seems also to be the case, so far as our experience goes, with the third and strongest vaccine, which contains equal quantities of T., A., and B., as recommended in our first communication on this subject.[1]

Our impression is that all these vaccines produce on the whole somewhat less reaction when made up in normal saline solution from agar surface cultures than when prepared from bouillon cultures. But the difference is perhaps not sufficiently significant to outweigh the greater simplicity and other possible advantages of preparation by the latter method.

Naturally, whichever method is employed some highly susceptible individuals will always be found whose reaction is much more severe than the average. But this also applies to the ordinary typhoid vaccine and, indeed, to every bacterial inoculation. A moderately strong reaction should not, in our opinion, be regarded as a disadvantage, since it seems to favour the development of immunity.

Dosage.

Comparing earlier results, following the use of the weakest vaccine, with those obtained with the two stronger vaccines we have no doubt that both the degree of immunity developed and its duration were distinctly greater in the case of paratyphoid A and B where the stronger vaccines were used. This was particularly evident in the case of paratyphoid A.

We came to the conclusion that the vaccine (i.) containing 1000 million T. and 500 million each of A. and B. was certainly somewhat too weak in paratyphoid bacilli to yield a satisfactory and sufficiently enduring immunity. We have, therefore, no doubt that the dosage of Castellani's triple vaccine is very much too small, since the number of bacilli contained in his total dose is only one-third of that given in our weakest vaccine. Accordingly, we are convinced that a vaccine containing not less than 1000 million T. and 750 million each of A. and B. per c.cm. should be used in doses of 0·5 c.cm. and 1 c.cm. as first and second dose respectively in order to ensure adequate protection against typhoid and paratyphoid infections.

Curves of Inoculation Agglutinins.

Curves of agglutinin formation in inoculated animals, showing the regular character of the rise and subsequent fall in the titre of the serum as determined by exact quantitative methods, have for years been familiar from the work of Madsen, Jörgensen, Dreyer and Schroeder, and others. Curves of this character worked out on man have enabled us to reach the following general conclusions †:—

(*a*) As the result of a single first inoculation with triple vaccine.

1. Agglutinins begin to make their appearance in the serum about the seventh day.

2. Thereafter they undergo a rapid increase in amount, reaching their maximum somewhere between the sixteenth and the twenty-fourth day, usually about the eighteenth to the twentieth. In any given individual the maximum of the A. agglutinins is generally a little antecedent (a day or two) to the T. maximum, while that of the B. agglutinins most frequen ly falls a little after the other two.

3. After the maximum is passed a regular fall begins similar to that familiar from animal experiment. It is at first rapid, becoming slower and slower with each succeeding day, until at last the fall is only measurable when intervals of some days are allowed between successive observations of the titre.

4. The actual height of the titre reached for each bacillus *varies very greatly* with the individual subject of inoculation, as also does the relative height of the titres obtained respectively for T., A., and B. When using the smaller doses of A. and B. contained in vaccine (i.) we found that the agglutinin titre reached in the case of A. was usually much lower than that for T. or B. But with the larger dosage of A. and B. (vaccines (ii.) and (iii.)) this difference was largely eliminated. Nevertheless, the individual differences in reaction remain very striking. Thus, of men inoculated with equal doses of the same vaccine one acquires a high titre to T. and a low one to both A. and B.; another reacts strongly to A. and less strongly to T. or B., or strongly to B. and less strongly to T. or A.

These facts suggest an explanation of how it happens that one individual freely and continuously exposed to typhoid infection may not become infected (while others similarly situated may do so), but will, nevertheless, readily acquire infection if exposed to paratyphoid A or paratyphoid B as the case may be, and similarly *mutatis mutandis*.

(*b*) Having learned what happens as the result of a single inoculation, we are now in a position to examine what occurs when the usual routine of giving two inoculations at ten days' interval is followed.

At the moment when the second inoculation is given the rise in agglutinin titre following the first inoculation has usually just began to become rapid. There occurs immediately a marked change in the rate of agglutinin production. This change is normally characterised by an actual fall in the curve of a few days' duration, after which the rapid rise already described again sets in and reaches its maximum between the sixteenth and twenty-fourth day, most frequently the eighteenth to twentieth day. The regular fall, then, follows as in the case of a single inoculation.

Duration of Immunity.

Though, owing to the wide range of individual difference between man and man in the height of the agglutinin titre reached after inoculation with equal doses of vaccine, we cannot say with certainty that the result of using two inoculations is to give a higher maximum titre in the individual, yet it is absolutely clear that the effect of the second inoculation is to *maintain* a high level of titre for a *much longer* period after the initial rather rapid fall from the maximum than in individuals who have had only a single inoculation of the vaccine. It follows that the use of two inoculations, at least, is an essential feature in the prophylaxis of enteric fevers, since it secures a more persistent relatively high immunity.

The duration of immunity following two inoculations is also affected by other important factors, quite apart from the incalculable factor of individual variation, which is the occasion of the very striking differences between man and man under identical treatment to which reference has already been made.

It appears to have been the impression in the minds of some observers that the protection obtainable by the inoculation of paratyphoid bacilli was only of brief duration. But time enough has now elapsed since our first inoculation experiments were made to enable us to state that while with the dosage used the paratyphoid immunity may be briefer than the typhoid immunity it appears to persist in adequately inoculated individuals for at least a year.

A most important factor affecting duration of immunity is the *time interval allowed between the first and second inoculation*. The length of this interval also strikingly influences the more immediate effect of the administration of a second dose of vaccine. We have already described the changes which occur in the curve of agglutinin formation when a second inoculation is given in the usual way after an interval of ten days from the first dose. If, however, the second dose is given at an earlier or at a later date new features appear in the curve.

1. If the second dose be given as early as the sixth or seventh day the commencement of the rise in the agglutinin titre of the serum appears to be delayed. Instead of beginning about the seventh day it may not become evident until some days later. No other obvious change in the curve has been detected, except that the day of maximum is somewhat postponed.

2. A second dose given between the thirteenth and the sixteenth day from the first inoculation, or at any later time before the maximum has been reached, usually produces no definite drop in agglutinin titre, but almost always gives rise to a kink or plateau in the curve, due to a temporary retardation in the rate of agglutinin rise. The earlier the date of the second inoculation within these limits the more marked is the temporary deviation from the regular rise. As in the former case, the maximum of the curve is somewhat delayed. But it is, on an average, definitely higher than the maximum obtained by a single inoculation.

It will, of course, naturally be realised that since, as has been pointed out, the A. agglutinin curve usually approaches its maximum a little earlier on the average than the T. curve, while the B. curve is a little later in its maximum than the T. curve, a second inoculation given on any particular day may affect each of the three agglutinin curves somewhat differently. Thus the A. curve may exhibit only a slight kink or deflection, while the T. and B. curves will show either a plateau or a definite negative phase in the agglutinin titre of the serum. But since, as has been stated, any one of the three curves may in a particular individual somewhat antecede the others, the phenomena just described may be variously arranged as regards the titre of the serum in T., A. and B. agglutinins.

3. If the second dose of vaccine be given at a still later period, when the agglutinin titre has either reached its maximum or has just passed it, the regular fall of titre proceeds at first in the usual manner. But it is arrested within a few days when a new rise in titre makes its appearance. This rise is very variable in extent in different cases. Sometimes it is very marked, and it may be so great as to reach a titre several times as high as the first maximum. But more usually it is of moderate extent, not greatly exceeding the first maximum or never reaching it, and forming only a small spike upon the curve. The increase in titre caused by the second dose of vaccine is the greater the more nearly the time of its administration coincides with the time when the maximal effect of the first dose is reached. And the later it comes after the maximum the less likely is the second maximum to reach or to exceed the level of the former.

The main effect, however, of giving the second inoculation within a few days of the maximum is that the subsequent fall is greatly modified. For though it sets in rapidly at first in the usual manner it soon becomes slow, so that the titre of the serum remains for a long time at a much higher level than would otherwise have been the case.

Now, it is evident that from the point of view of prophylaxis it is more important to obtain a relatively high level of persisting immunity than a very high immunity of only brief duration followed by a rapid fall to a much lower level.

Though the foregoing observations were worked out on a material which was necessarily of limited extent, we are convinced that they represent the facts in relation to the effect of the second dose of vaccine—namely, that a *more lasting immunity is obtained by administering it at a time when the effect of the first has reached (approximately) its maximum*. The facts accord completely with those observed by Dreyer and Schroeder in regard to the reaction of blood regeneration following successive bleedings when a second bleeding is made at different intervals of time after the first. Moreover, this conclusion is in entire agreement with general experience in animal experimentation for the routine production of antibodies of various kinds. It also agrees with what is seen in *relapses* of enteric fevers, where, though the maximum agglutinin titre reached in the relapse may not exceed the titre reached in the primary attack, yet a high level of titre is subsequently maintained for a much longer period than is the case in patients who do not suffer from relapses of the disease.

We are therefore of opinion that *it would prove advantageous to lengthen the interval between the first and second dose of vaccine from 10 days to 18 or 20 days* (about three weeks) in making prophylactic inoculations against typhoid and paratyphoid fevers.

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† The date for two or three such curves still exist, but are at present inaccessible. The curves drawn from them will be published on a future occasion when opportunity occurs for their recovery.

PERSISTENT CARRIERS OF *ENTAMŒBA HISTOLYTICA*:

TREATMENT WITH CHAPARRO AMARGOSA AND SIMARUBA.

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(A Report to the Medical Research Committee from the Mont Dore Military Hospital, Bournemouth.)

THE 81 cases with which this report deals were all carriers of *Entamœba histolytica*, who, with a single exception, had been treated with at least two courses of emetine bismuth iodide, but still continued to pass either cysts or free *E. histolytica* in their stools. They may be regarded, therefore, as a group of cases especially refractory to treatment with emetine.

It will be seen that 74 out of the 81 cases were treated with the drug known as "chaparro amargosa" (i.e., "bitter-bush"), which grows wild abundantly in Southern Texas and Mexico. Its botanical name is *Castela nicholsoni*. The use of decoctions of this plant for dysentery has for some time had a local reputation, but attention has been specially drawn to it recently in several papers by Dr. P. I. Nixon, of San Antonio, Texas.[1 2] The Medical Research Committee obtained several parcels of the drug, with a view to further investigation of its properties, and we are indebted to the help of Dr. H. H. Dale, F.R.S., of the committee's staff, for the specimens with which we carried out the treatment of our cases. Three samples of drug were tested by us, each prepared by drying and powdering a different part of the plant—viz., (1) twigs and leaves; (2) root bark; and (3) decorticated root. In addition a few cases were treated with a crystalline bitter principle extracted from the drug by Dr. A. J. Ewins, which is still a subject of investigation in the Medical Research Committee's Bio-chemical Department.

Simaruba bark has a somewhat similar reputation in the treatment of amœbic dysentery. It is obtained from a plant botanically related to chaparro amargosa, and contains a similar, if not identical, bitter principle.[3] We treated a few cases with simaruba bark for comparison.

Our method of administration was in both cases based on that recommended by Nixon for chaparro amargosa.[1 2] In every case an interval of at least three weeks elapsed between the termination of the last course of emetine bismuth iodide and the commencement of the chaparro treatment, and during this interval cysts or free forms of *E. histolytica* were discovered at least twice in the stool. In most of the cases recorded as cured by chaparro the interval was four to five weeks, and three or four "positive" examinations were made during this period.

We can therefore with some confidence exclude the possibility that any of the apparent results of chaparro treatment were due to a delayed action of the course of emetine. We have regarded a case as "cured" after a minimum of six negative stool examinations, taken over a period of not less than five weeks from the end of treatment. The last examination in each case was made at the convalescent depôt, Barton-on-Sea.

Treatment with Chaparro Amargosa.

Method of administration of the drug.—The treatment lasted ten days, except in 7 cases on the twigs and leaves, in which it lasted seven days.

The dose was five heaped teaspoonfuls daily of powdered chaparro amargosa. Decoction from three of these teaspoonfuls was given by mouth, and from two by enema. The method used for preparation of the decoction was to boil the heaped teaspoonful of chaparro amargosa powder in about 20 oz. of water for 15 to 30 minutes. It was allowed to cool and then strained.

Three times every day a teaspoonful of the powdered drug was thus prepared and given to patient to drink half an hour before meals. At about 10 A.M and 6 P.M. an enema of the drug, also prepared as above, was given to patient in elbow-knee position. A rubber catheter (warmed and oiled before introduction) was used, connected by rubber tubing to a glass funnel. The patient remained in the elbow knee position for 15 minutes if possible after injection, and was kept in bed for at least two hours after the drinks and enemas.

On the day before the treatment the bowels were well opened with mag. sulph., and the patient given a light diet, such as fish or chicken.

Symptoms caused by the drug.—A few patients vomited after the drinks, and some had nausea after the drinks without vomiting. In a few cases the enemas caused increased motions and abdominal pain. The chaparro acted on many patients as a bitter tonic, causing marked increase in the appetite and improvement in the general condition.

Results of Treatment.

1. *Twigs and Leaves.*

The treatment lasted seven days; drinks and enemas were given. Number of cases treated 7; 4 cured—i.e., 57 per cent. One case when put on treatment had dysenteric symptoms with free *E. histolytica* in stools. The other 6 cases had *E. histolytica* cysts in stools.

Vomiting.—There was none.

Pain.—Two cases had general abdominal pain during treatment, especially over transverse and descending colon. One of these cases had dysenteric symptoms with free *E. histolytica* in stools; this case was not cured. Two cases had general abdominal pain during last two days of treatment. Both these cases were cured.

Bowels.—In the case with free *E. histolytica* in stools there was marked increase of number of motions per diem.

Nausea without vomiting.—The two cases with increased abdominal pain suffered from nausea each day of treatment after the drinks.

In the remaining five cases the drug caused marked increase of appetite and the patients felt better for the treatment. Three out of these five cases were cured.

2. *The Root Bark.*

The treatment lasted ten days; drinks and enemas were given. Number of cases treated 30; 11 cured—i.e., 36·6 per cent.

Vomiting.—Four cases suffered from vomiting. Two cases vomited only once after treatment and that after first drink on first day of treatment. One case vomited after first drink on first and second days of treatment. All these cases who vomited were cured.

Bowels.—Two cases had increased number of motions per diem during treatment. Both these cases had free *E. histolytica* in stools, with dysenteric symptoms when put on treatment; neither of them was cured.

Pain.—Five cases had increased pain distributed generally over abdomen during each day of treatment. This includes the two cases mentioned above with free *E. histolytica* in stools; in these two cases there was increased tenderness over ascending, transverse, and descending colon. None of above cases were cured. Two cases had during treatment increase of pain and tenderness over descending colon. One of these cases was cured. Eight cases had occasional abdominal pain, five of whom were cured.

Nausea without vomiting.—Two cases suffered from nausea after drinks during each day of treatment: one case after drinks of first and second days of treatment only.

In 15 cases the root bark caused increase of appetite and patient felt better for the treatment.

3. *The Root.*

(*a*) The treatment lasted 10 days; drinks and enemas being given. Number of cases treated 27; 13 cured—i.e., 48 per cent.

Vomiting.—Four cases suffered from vomiting. Three cases vomited after first drink of first day of treatment, two of these cases were cured. One case vomited on first and second day of treatment after first drink. This case was not cured.

Bowels.—In two cases the treatment caused an increase in number of stools per diem. Both these cases had free *E. histolytica* in stools and dysenteric symptoms when put on treatment. These two cases were not cured.

Pain.—Eight cases suffered from general abdominal pain during each day of treatment. This includes the two cases mentioned above with free *E. histolytica* in stools. None of these cases were cured. Five cases suffered from occasional abdominal pain, one of whom was cured.

Nausea without vomiting.—One case had nausea each day after drinks. Two cases had nausea after each drink on first and second days of treatment only.

Fourteen cases felt much better for the treatment and had marked increase in their appetites; 12 of these cases were cured.

(*b*) In six cases drinks only were given without enema injections. The treatment lasted 10 days. Three out of six patients thus treated were cured—i.e., 50 per cent.

Vomiting.—None.

Bowels.—No change in condition or number of motions.

Pain.—The treatment caused no abdominal pain.

Nausea.—One case had nausea after drinks during whole of treatment; this case was not cured. One case had nausea after drinks during first and second days of treatment only; this case was cured. One case had nausea during first day of treatment only and was not cured.

All the above cases except the one patient who had nausea during each day of treatment felt much better for the treatment and had increased appetite.

Second Course of Treatment.

Twelve cases who had not been cured by the first course were given a second course of chaparro amargosa, drinks, and enemas. In 9 of these cases the first course had consisted of drinks and enemas, and in 3 cases the first course had been one of drinks only. None of these cases on the second course of treatment were cured. Out of the 9 cases above-mentioned 3 had dysenteric symptoms with free *E. histolytica* in their stools. The symptoms caused by the second course of treatment were practically the same as in the first course.

Chaparro Amargosa, Bitter Principle.

Three cases were given the bitter principle extracted from chaparro amargosa root bark. The dosage was equivalent to that given in the other forms of the drug and the same method of treatment was carried out, with the exception that the drug given by the mouth was given in cachets. None of the cases were cured. Cases 1 and 2 had *E. histolytica* cysts in the stools. Case 3 had free *E. histolytica* with dysenteric symptoms, and this case had had a previous course of chaparro amargosa root extract.

Vomiting.—None.

[1] Amer. Journ. of Trop. Dis., 1915, ii., 572.
[2] Journ. Amer. Med. Assoc., 1916, lxvi., 946.
[3] Medical Research Committee, Third Annual Report, 1917.

Bowels.—Case 3 had increased motions during treatment.

Pain.—In Case 1 treatment caused occasional pain over area of transverse colon. Case 2, no pain. Case 3 had general abdominal pain, especially severe over whole colon area, during each day of treatment.

Nausea.—Case 3 had nausea after each of the drinks.

Cases 1 and 2 were given a second course of treatment with the bitter principle; the drug had the same effect. The cases were not cured.

A fourth case was treated who had had no previous treatment for amœbic dysentery and had contracted the disease in France three months before treatment with the bitter principle. This case was not cured. There were nausea and headache during the treatment and occasional abdominal pain. After the failure of the bitter principle a course of chaparro amargosa root was tried, which also proved a failure. This case was subsequently given a course of salol coated emetine bismuth iodide pills, gr. iii. per day for 12 days, and was cured.

Simaruba Bark.

Seven cases were treated and 3 were cured—i.e., 42·8 per cent. The method of treatment was the same as for chaparro amargosa. The bark was cut into about ½-in. lengths and treated the same as the chaparro preparations. The dose varied from a half to two handfuls.

Three cases were given drinks and enemas made from half a handful of the pieces of bark for each dose. One of these cases was cured.

Three cases were given one handful of the pieces of the bark for each dose. One of these was cured.

Another case was given two handfuls of the pieces of the bark for each dose and was cured.

The cases given a half handful to the dose suffered no ill-effects from the drug.

Of the three cases with one handful for each dose, one suffered no ill-effects. The other two had nausea after the drinks.

The case with two handfuls for each dose had nausea each day after the drinks and vomited after each drink on first day and after first drink on second and third days of treatment.

Conclusions.

The results with the different preparations may be summarised as follows:—

Preparation.	Cases treated (81).	Cases "cured" (34).
Chaparro, twigs and leaves ...	7	4
,, root-bark	30	11
,, root	33	16
,, bitter principle ...	4	0
Simaruba	7	3

The numbers of cases treated with the different preparations are not sufficiently large to warrant any comparison based on percentages of cures. It is noteworthy, however, that the root-bark of chaparro, which, as we are informed, gives a much larger yield of the bitter principle than the other parts of the plant, shows, at any rate, no better therapeutic performance than these; and, in conformity with this finding, we failed to cure any case treated with the isolated bitter principle. Yet the presence of such principles, either identical or very closely related, in both chaparro and simaruba is highly suggestive of their connexion with the therapeutic action common to these drugs. Possibly the few cases treated with the bitter principle happened all to be refractory to the effect of chaparro; we know that one had previously been treated with the drug without success, and that another was uncured by a course of the drug after the isolated principle had failed.

When a first course of treatment with chaparro amargosa has failed, a second course of treatment does not appear to be of any use; 12 cases were so treated with a second course and none were cured.

Concerning the effects incidental to the treatment it may be noted that pain, vomiting, nausea, and increased number of motions were caused by all preparations, except the twigs and leaves, which gave no vomiting; but only 7 cases had this preparation. In no case were the above symptoms so severe as to interfere with treatment.

No case with free *E. histolytica* in the stools was cured, and in these cases abdominal pains and the number of motions per diem were increased by the treatment.

The percentage of cures was higher among those cases who suffered no ill-effects from the drug and whose general health improved during treatment.

Of the six cases who were given drinks without enemas three were cured, and it is possible that enemas are not an essential part of the treatment.

The bitter principle extracted from the chaparro amargosa root bark caused the same symptoms as the other forms of the drug, but of the four cases treated none were cured.

The simaruba bark when given in the way described above, with two handfuls to each dose, has very much the same effects as the chaparro amargosa preparations.

Our thanks are due to Lieutenant-Colonel T. H. F. Clarkson, R.A.M.C., officer commanding Mont Dore Military Hospital, Bournemouth, for permission to publish this report.

Clinical Notes:

MEDICAL, SURGICAL, OBSTETRICAL, AND THERAPEUTICAL.

A CASE OF TRAUMATIC RUPTURE OF JEJUNUM.

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APART from the rarity of the accident there are many points of interest in the following case:—

Deck hand A. B., R.N., aged 44, was admitted to hospital on Nov. 26th, 1917, at 12.30 P.M., complaining of severe abdominal pain. Whilst embarking on to his ship on the 25th, about 7 P.M., and half-way up the gangway, he fell into the water, a distance only of 6 feet. It is probable that during the fall he struck some obstacle. On external examination well-marked bruise over left anterior superior spine of ilium; no other sign of external injury.

After being rescued from the water patient vomited and complained of severe pain in lower abdomen. He was under the influence of drink. No recurrence of vomiting until 11.30 P.M. same evening; after this no more vomiting. He was treated on H.M.S. —— till the following morning when he was transferred to hospital.

On admission patient was in critical state; face pinched, respirations thoracic, tongue dry, and sordes about mouth. P. 150, T. 97°, R. 40. Both recti abdominis were rigid, no abdominal movement; absolute constipation since accident. Abdomen not distended; no diminution of liver dullness. There was dullness in both flanks; whole abdomen extremely tender. No bladder dullness, but small quantity of urine obtained which contained mainly blood.

The diagnosis was intraperitoneal rupture of some viscus, thereby causing general peritonitis. The one favoured was that of intraperitoneal rupture of the bladder for the following reasons: (1) Site of bruise with (?) fracture of pelvis; (2) presence of large quantities of blood in urine; (3) free fluid in peritoneal cavity; (4) absence of flatulent distension of abdomen. The special tests for ruptured bladder were not applied owing to critical state of patient.

Operation.—General anæsthesia having been administered laparotomy was performed without delay. Median subumbilical incision; on opening peritoneal cavity large quantities of straw-coloured fluid, not offensive, exuded; no gas. Bowels in state of general peritonitis. On careful examination bladder and kidneys were found normal. The small intestine was then examined. On approaching upper part of abdomen trace of bile noticed; large perforation size of shilling piece found in jejunum about 12 inches from duodenojejunal flexure; the part was freely movable. Perforation was of punctate variety with slightly ragged edges on antimesenteric border. Gut perfectly healthy; no sign whatsoever of previous ulceration or existing disease. The perforation was sutured, reinforced by Lembert sutures in transverse direction. Peritoneum cleansed; drainage suprapubically and in both loins. Saline enema given before leaving theatre, with 1/30 gr. strychnine hypodermically. Patient in very weak condition. He rallied for a few hours but succumbed at 5 P.M. the following day.

A post-mortem examination showed no other macroscopic internal injury, the blood in the urine arising from contusion.

Conclusion.—This accident is rare, and certain questions arise. 1. Why should an external injury cause rupture of free hollow viscus remote from seat of violence? 2. In the presence of a bowel perforation why was there so little gas in the abdominal cavity? The absence of this, together with normal liver dullness, increased the difficulty in diagnosis. The size of the rupture certainly hastened the onset of general peritonitis. The theory as to the cause of the perforation is of interest. Possibly owing to the sudden increase in intra-abdominal pressure the intestine gave way. Or is it possible that the man in falling struck some object which nipped the bowel between itself and the vertebral column, leaving no bruise on the abdominal wall except that on the anterior superior spine of the ilium? The short distance of the fall also adds interest to the case. I am indebted to Fleet-Surgeon E. A. Grazebrook and Lieutenant-Colonel A. E. Weld for kindly permitting me to publish this case, and to Captain O. R. Belcher for his assistance at the operation.

NOTES ON TWO CASES OF BENIGN TERTIAN MALARIA TREATED BY DISODO-LUARGOL.

BY LOUISA HAMILTON, M.D., B.S. LOND.,
AND
MORNA RAWLINS, M.B., B.S. LOND.

THE following two cases of benign tertian malaria were treated, apparently successfully, by intravenous injections of disodo-luargol:—

CASE 1.—Lieutenant ——, aged 45, came under observation on April 15th, 1917. He had acquired malaria in Bismarck Archipelago in March, 1915, and had had treatment since with quinine by mouth and intramuscularly. He had had repeated attacks of malaria, not regularly recorded, but sufficiently frequent for him to be invalided to Australia. From July, 1916, to January, 1917, the attacks came at about intervals

of six weeks, and from January to April, 1917, about every 2-3 weeks. During this time until February he was treated with quinine, both orally and intramuscularly, without benefit.

Patient was examined on April 11th. Height 5 ft. 8 in., weight 8 st. 13 lb. (in clothes); was anæmic, markedly deaf, and depressed. Organs all healthy; spleen could not be felt. Last attack three weeks prior to examination. Blood: R.B.C., 4,186,000; W.B.C., 3700; Hb, 65 per cent. Differential count normal; no parasites seen.

It was decided to try disodo-luargol; intravenous injections were given at intervals of 3-4 days, from April 14th to May 18th; no quinine during this time. The following seven doses were given: 0·05, 0·10, 0·15, 0·20, 0·25, 0·25, 0·20 g.; total, 120 cg.

After first injection expected malarial attack occurred; tertian parasites found in blood. Attack not so severe as previous ones, temperature only 102·6° at highest, instead of 104°-105°. The second attack did not develop, second injection of disodo-luargol being given on that day. Along with injections of disodo-luargol, subcutaneous injections of Fe cit. 1½ gr. were given. On May 4th blood count showed: R.B.C., 4,788,000; W.B.C., 5000; Hb. 80 per cent.

No further attack of malaria has developed up to present date, 10 months since injections were commenced. Deafness had disappeared; colour now good; weight 9 st. 7 lb.

CASE 2.—Captain ——, aged 41, came under observation on May 21st. He acquired malaria in Struma Valley. Had taken quinine at intervals, about 30 gr. a day, without seeking medical advice. Attacks at first irregular, but for some months before being seen they had occurred at intervals of 2-3 weeks. Patient well developed, robust-looking. Except for anæmia, pyorrhœa, and slightly enlarged spleen, organs normal. Blood: R.B.C., 3,660,000; W.B.C., 4000; Hb, 62 per cent.; differential count per cent: Polymorphonuclears, 42; lymphocytes, 40·75; hyalines, 14·75; eosinophiles, 1·75; basophiles, 0·75. No parasites found at first examination. But later, before injections were begun, tertian parasites present in considerable numbers.

Patient was given six injections of disodo-luargol at about 4 to 8 days' interval, from June 5th to July 17th, doses were: 0·05; 0·10; 0·15; 0·20; 0·25; 0·25 g.; 100 cg. in all. During this time he was given no quinine but Fe cit. 1½ gr. subcutaneously, concurrently with intravenous injections of disodo-luargol. On July 8th, 9 days before last injection, he had an abortive attack of malaria; parasites in films (taken on July 14th) much degenerated.

Patient was not regular in attendance, but despite this has had no attack since the one recorded on July 8th (seven months ago).

Disodo-luargol, discovered by Professor Danysz (Pasteur Institute), is a neutral salt of silver, arsenic, and antimony. It consists of a blackish-grey powder, easily soluble in water, making a dark-brown solution. The dose to be given was dissolved in 10 c.cm. of doubly distilled water, filtered and injected with a glass syringe.

The following were our reasons for trying intravenous injections of the above salt. 1. Arsenic and antimony have both been injected separately and found useful in some cases of malaria, whilst failing in others. We thought, therefore, that the combined action of arsenic and antimony together with silver might be useful. 2. Intravenous medication appeared peculiarly suitable for the treatment of a disease caused by a parasite so frequently present in the blood stream. 3. It is stated that disodo-luargol is less toxic than the other preparations of arsenic and there should consequently be less risk attending its use.

NOTE ON AN OUTBREAK RESEMBLING EPIDEMIC CATARRHAL JAUNDICE IN ENGLAND.

BY G. C. GRAY, M.R.C.S., L.R.C.P. LOND.,
CAPTAIN, R.A.M.C. T.

DURING the four months August to November, 1917, I attended in my private practice over 70 patients who appeared to suffer from a complaint somewhat resembling epidemic catarrhal jaundice (Weil's disease), but differing from it in that (1) 25 per cent. of the cases never showed signs of icterus; (2) no enlargement of spleen was made out; (3) albuminuria occurred in only a few instances.

The outbreak started very gradually, a case springing up here and there. It then became intense and remained so for about nine weeks. Suddenly it ended, except for a few cases occurring from time to time. All quarters of the town were equally affected, but surrounding villages suffered little. Rich and poor were attacked equally, and adults and children in about the same proportions. In the adults, however, female cases greatly predominated, whereas in children the numbers were equal. I attended no case under 5; generally the younger the child the milder the disease. Nearly all the children developed jaundice, but a considerable number of adults did not, although presenting all the other signs and symptoms. A typical case was as follows:—

Patient complained of having felt unwell for several days, suffering chiefly from headache, nausea, pains in stomach and over liver. Temperature 100° to 102° F.; pulse rapid. Heavily furred tongue and very offensive breath. Tenderness in abdomen on slight pressure, chiefly in epigastrium. A day or so later vomiting started. This was a most constant feature, occurring first in direct relation to food, afterwards it became much more frequent, and was often very troublesome and distressing to the invalid. This was usually followed by diarrhœa. Temperature now 101°-104°, in several as high as 105·4°. Liver enlarged slightly, and patient complained on pressure over gall-bladder. No enlargement of spleen made out in any case. Most of the adults complained of difficulty in sleeping, although appearing very drowsy. In a few cases cloud of albumin in urine; in remainder none detected.

Between the seventh and fourteenth days from onset jaundice appeared in 75 per cent. of the cases, but, as before mentioned, was far more constant in children than in adults. This was usually intense, but there was rarely complete obstruction of bile duct. From this point there was a rapid change for the better. Vomiting and diarrhœa soon ceased, temperature dropped, and in a few days, except for being yellow, patient appeared normal; the icterus, however, remained for a considerable time.

In a few mild cases patient had malaise and afterwards became more or less jaundiced, but was never bad enough to lie up. In other cases the gastro-enteritis was most marked, but there was little or no jaundice.

I had one death only, in a man already suffering from advanced cirrhosis of the liver.

In four cases two members of a household were attacked, in one case three, and in one four.

I. Patient developed complaint. Her son, aged 6, who slept with her during the early stages, 17 days later became a victim without being exposed, so far as one could judge, to any outside infection. Shortly afterwards the first patient's sister, who was acting as nurse, caught it herself. Two months later a new servant went into the house, and within three weeks fell with the disease. The other members of the household, including a delicate baby, remained unaffected.

II. Two brothers were attacked on the same day, and 16 days later their mother, who had nursed them, herself became a victim.

I have not mentioned treatment as nothing seemed very satisfactory, and the best I could do was to treat the symptoms as they arose.

Newmarket.

Medical Societies.

ROYAL SOCIETY OF MEDICINE.

SECTION OF MEDICINE.

Spirochætosis Icterohæmorrhagica.

A MEETING of this section was held on March 28th.

Sir BERTRAND DAWSON gave a lecture on Spirochætosis Icterohæmorrhagica. After a comprehensive review of the pathology of the disease the lecturer expressed his opinion that the evidence as to its cause was complete and its method of transmission fairly assured. The spirochæte can be found in the peripheral blood stream of patients suffering from the disease. The injection of infected human blood into the peritoneal cavity of the guinea-pig produces a characteristic fatal illness, spirochætes being abundantly present in its tissues. The spirochæte has been isolated in pure culture, which produces the disease when inoculated into a guinea-pig. The disease has been produced in man by accidental inoculation from an infected guinea-pig. After the first fortnight of the disease the spirochæte is found in the patient's urine and from the third week on his serum agglutinates the organism. The lecturer illustrated by means of the epidiascope the pathological conditions found in liver and kidneys and showed charts of cases.

In the course of the discussion Surgeon-General Sir DAVID BRUCE said that no spirochætes had been found in cases of jaundice in South Africa. There was no proof that spirochætes had been found in trench fever. None were present if precautions were taken in collecting the urine. He thought that there was not yet sufficient proof to warrant the assumption that the infection with *S. icterohæmorrhagiæ* took place by the mouth. The same thing had been said of malaria before it was proved otherwise. Infection might occur through the skin.

Surgeon-General H. D. ROLLESTON said that probably many cases of "Weil's disease" were spirochætal jaundice, whilst the splenic enlargement in others might be evidence of enteric jaundice. He asked if there was any evidence of acidosis in the terminal stages (with coma and air hunger). Had the speaker tried the serum of patients who had recovered? He believed the Japanese had used horse serum.

Sir BERTRAND DAWSON, in reply, said that he had not used the Japanese serum, as the cases had become so mild. He had used horse serum prepared in England, but the number of cases were too few on which to judge the result. He had tried salvarsan with no effect. He had tested for acidosis in one case, but had got a negative result.

Reviews and Notices of Books.

The Science of Power. By BENJAMIN KIDD. London: Methuen & Co., Ltd. 1918. Price 6*s.* net.

THE posthumous work of the author of "Social Evolution" is a real contribution to modern thought. "Social Evolution" had a great vogue twenty years or more ago; it was much regarded by the public, and if its reception by the scientific world was not altogether favourable, there was a consensus of approval of many of the conclusions. In "The Science of Power" we find the author more mature, more versed in affairs. Writing in a clear style, free from the nebulosity which marred his earlier works, both "Social Evolution" and "The Principles of Civilization," he makes his points with sureness and preserves the thread of his discourse, although in his last book he employs reiteration to an unnecessary extent in his desire to drive his facts home.

The first part of the work deals with the position of the early Darwinians, who centred their attention on the survival of the fittest in the individual—individual integration Kidd calls this—disregarding social integration completely. The proposition began and ended, the author states, in epitome: "If A kills B before B can kill A, then A survives." Later on writers on evolution began to be aware of the factor of social integration, and in particular it was seen by the medical profession that efforts to prevent the elimination of the weak in body and mind, though running contra to any process of survival of the individual fittest, had a more important bearing on the evolution of the race. Kidd himself has pointed out[1] how this social sense of the responsibility to life is in reality one of the determining causes making for the success of the higher societies through natural selection. It is really a question of the lesser and more immediate social benefit being subordinate to one greater and more remote. With the older evolutionists the greatest stress was laid on heredity, culminating in the science of eugenics. Kidd lays stress on the far more important factor of social integration, instances Japan and Germany as proving how in a generation an immense racial transformation can be made, and adduces experiments made by himself on lower animals, both domesticated and wild. "I experimented," he says, "with a number of wild species of British birds and mammals. In none of them did I find any trace in the young of an inborn, instinctive fear of the natural enemies which were regarded with fear and terror by the adult of the species. Young wild hares and young wild rabbits showed no inborn fear of either dogs or cats." These, he found, became friendly and playful from the beginning with specially trained cats to which they were introduced as if they had been all of the same species. Young rabbits, showing no inborn fear of dogs, would frisk and play with the hereditary enemy of their kind by whom their species had been hunted for tens of thousands of generations. The young of wild birds, he demonstrated, showed no inborn fear of the cat, if, when fully fledged, they were introduced to the animal for the first time under proper conditions. Nor did they develop any fear afterwards; the universal and ineradicable fear of natural enemies being the result of social heredity imposed on the young of each generation by training and example, and nearly always under conditions of strong emotion. Approaching the nest of a wild duck he found that the newly hatched young were entirely friendly; after a short interval, during which the mother had returned, he revisited the nest, when the mother gave warning chatterings, every feather quivered with excitement, and she flew away with a series of loud warnings. The little ones then scattered to cover, cheeping with terror; one he found was a wild transformed creature, trembling with panic which could not be subdued.

The last chapters of the book deal with that section of society which he believes to possess those qualities which will exercise a controlling influence on the world of to-morrow owing to its inherent relationship to maximum power. That section of society is not the fighting male, who he finds a failure, but the female who has been kept in the background of civilisation.

The close reasoning and the novelty of the suggestions must commend the work to a very large public, and stir national thought at the present time.

[1] In his Preface "Evolution," to the XXIX. Vol. of the Encyclopædia Britannica.

The Edinburgh School of Surgery before Lister. By ALEXANDER MILES, Surgeon to the Royal Infirmary, Edinburgh. London: A. and C. Black, Limited. 1918. Pp. 220. Price 5*s.* net.

THIS unpretentious and extremely interesting little book is a volume of the Edinburgh Medical Series, and is a valuable record of the great school which it commemorates. The Edinburgh School of Surgery, in the same way as most European schools of surgery, grew out of an incorporated body of barber surgeons. These persons received their Charter in the year 1505, 35 years before a similar body was incorporated in England, and one of their first acts was to present to the Town Council a petition in which the following request was included: "That we may have anis in the yeir ane condampnit man after he be deid, to make anathomia of, quairthrow we may heif experience, ilk ane to instruct utheris, and we sall do suffrage for the soule." Thus Christian charity and a proper regard for the foundations of surgery went hand in hand, and the petition goes on to say that the petitioners desire and intend "that everie man that is to be made frieman and maister amangis us be examit and previt in their poyntes following—that is to say; That he knaw anatomea nature and complexyoun of every member in manis bodie. And in like wayes he knaw all the vaynis of the sam yn thatt he may mak flewbothomea in due tyme. And als thatt he knaw in quhilk member the signe hes domination for the tyme, for every man aucht to knaw the nature and substance of evry thing thatt he wirkis or ellis he is negligent ....." It was not then for want of desire to know that the surgeons of that time were ignorant. "Complexyoun," we should say, was the technical term for any combination of the four qualities: hot, moist, cold, dry, and the word was applied to tissues as well as to the whole man. Thus, we find in a treatise on surgery, attributed to Thomas Vicary, which appeared in 1577 (he was Master of the Barber Surgeons Company of London several times from 1550), "The Grystle ..... is of complexion colde and dry ..... The flesh is in complexion hote and moiste." Out of the above petition grew the School of Anatomy, which may be said to have been established in 1694, Alexander Menteith being the leading spirit. He was granted by the Town Council "those bodies that dye in the correction-house" and "the bodies of fundlings that dye upon the breast ..... for the encouragement of so necessary a work as the improving of anatomy." He was also granted "a convenient house for dissection." Menteith's venture, however, failed, and in 1697, he abandoned the teaching of anatomy, but in the interval between 1694 and 1697 the Corporation of Surgeons had not been idle, and an anatomical theatre had been built where anatomy was studied and a public dissection was given once a year.

The School of Surgery was not definitely founded until about the middle of the eighteenth century, the two Bells, Benjamin and John (they were no relations), being the chief actors. The site of the school was the Royal Infirmary, which had been opened in 1741. The Faculty of Medicine in the University had been founded in 1726, when the first of the Monros became professor of anatomy, but no chair of surgery was founded until 1831. But much of the fame of the Edinburgh School of Surgery was connected with the Extra-Mural School—i.e., teachers not connected with the University at first, though in many instances they were transferred to the University. Among such were Charles Bell, James Syme, and Joseph Lister. Robert Liston and William Fergusson were always extra-mural. Syme died in 1870, and with his passing the era of pre-Listerian surgery came to an end.

The book is the record of a great school and of great names, and to us of to-day the chief feeling aroused by the deeds therein mentioned is wonder at the extraordinary fortitude of the patients and the boldness and skill of the operators in the days before anæsthetics. We need only refer the reader to John Bell's account of his operation for aneurysm of the iliac artery (p. 71) and three cases reported by Syme (pp. 180 and 198 *et seq.*).

THE LANCET.

LONDON: SATURDAY, APRIL 6, 1918.

Making the Best of Things.

THE engines of destruction and mutilation have developed under our eyes during the last four years to a refinement which hardly bears contemplation. All the resources of chemistry and of physics have been invoked for the purpose, and secrets newly wrested from Nature have been applied relentlessly to the undoing of Nature's greatest creation. Medicine alone is fortunate in having contributed nothing to the disruption of the delicate mechanism of the human frame, and in having kept her hands clean to bind up the wounds of war and her thoughts free to devise the means of restoration. From the onset many of our most prominent physicians, surgeons, and bacteriologists have devoted their whole attention to the solution of the problems of restoration, and much has already been achieved. Nothing is perhaps more striking than the practical disappearance of such wound complications as tetanus and gas gangrene. We have repeatedly dwelt on the strange new conditions under which these terrible distempers, known chiefly by hearsay to our pre-war surgeons, reappeared upon the scene and dominated the early surgery of the war, running rampant with an alarming toll of life, until free incisions, excisions, and, at the last, amputations, combined with prophylactic measures, became the accepted necessity. Healing by first intention, the keystone of modern surgical technique, had to be surrendered, and the slow closure of large open wounds exhausted the patience of surgeon, nurse, and patient alike, and demanded hospital accommodation which could only be provided at immense cost and sacrifice of civilian interests, a sacrifice that threatened to react upon our military efficiency.

Gradually, but very importantly, the situation has bettered. Coöperation between bacteriologist and surgeon has shortened the period required for healing; secondary suture after various kinds of preliminary wound treatment has been more and more widely practised. Now hope is drawing near of an immediate closure of gunshot wounds, devoid of the risks of septic infection, and with results more comparable to those obtained in the wounds of surgical procedure. Among the kaleidoscopic changes of war none would be more striking than this, if fully realised. To hundreds and thousands of men in the prime of life it would mean a more or less immediate restitution to soundness, in the place of a long period of intolerable ennui, if nothing worse—a period succeeded by a measure of disablement, and associated in too many cases with moral deterioration bred of discouragement. For the present, doubtless, primary suture of all gunshot wounds is an unrealisable dream, for in many such injuries irreparable damage has already been done over and above mere loss of continuity of structures. In all these cases the best must be made of things, and to this end, in addition to professional skill, something more is required. It is the prophetic insight that sees the end from the beginning; that forms a clear mental picture of what will be the injured man's condition three, six, twelve months ahead; that frames a plan of restoration consistent with this picture, and sees the plan carried through; and that makes the patient a partner in carrying out the plan. If the issue is to be one of physical disablement due to destruction or loss of function of a part, the plan will include, first, the minimising of this disablement; secondly, the education and training of other parts to replace the lack; and, thirdly, the adaptation of the man to a new environment in which the loss is not felt. The programme is simple enough in the stating, but calls for faith, hope, and loving treatment for its carrying out.

The administrator is, as a rule, not a prophet; and the ingenious deviser of bacteriological technique may also not possess this quality, nor may the rapid and skilful operator. In America, however, the orthopædist could justify a claim to prophetic gifts, and the conception of preventive and curative orthopædics recently enunciated by Sir ROBERT JONES covers much of the ground which intelligent vaticination would survey. Some have complained that orthopædics resembles the many tentacled octopus, and that when the military beds of a hospital have been emptied of all the cases included officially as "orthopædic" in the War Office Memorandum on orthopædic centres, there is little left behind for the general surgeon. There is certainly reason to feel that if within the heading of orthopædics so much must be embraced, the number of centres will have to be increased and their connexions improved with big urban centres and hospitals with many beds. However this may be, the injured man, whether service man or pensioner, will have reason to be grateful to any agency that undertakes the task of reintegrating him with his surroundings and sees the process through to its completion. This is the design of those in charge of the orthopædic cases, and of the cases of injury to the face and jaw. Similar foresight and extensive vision will have great results wherever they are applied.

The Association of Panel Committees.

THE Memorandum of the Association of Panel Committees briefly referred to in a recent issue of THE LANCET[1] makes out a strong case in favour of the organisation which has issued it in order to explain to Panel Committees its position and aims. As is, of course, well known, there are already two bodies in the field working in the interest of panel practitioners, and the Association of Panel Committees states emphatically that it appreciates the value of their efforts and denies any intention of running counter to either of them. It is, however, justified in pointing out that neither the British Medical Association nor the Panel Medico-Political

[1] THE LANCET, March 23rd, 1918, p. 445.

Union can claim to cover the whole of the ground as a representative body coextensive with the panel profession. The British Medical Association includes a very large proportion of the medical profession, caring, as it does, for the interests of all branches with which it is concerned. The Panel Medico-Political Union is more a trade-union composed of members of the panels, but not including all of them, or likely ever to do so. The Panel Committees, on the other hand, are statutory bodies brought into being for the express purpose of representing the panel practitioners in their respective areas, and are recognised as being so representative by the Insurance Commissioners.

An organisation such as the Association of Panel Committees should find no insuperable difficulty in obtaining the adhesion of all, or of practically all, the Panel Committees, a very different matter from enrolling a membership composed of individual practitioners. It should equally be able to provide for the election of an Executive Committee representing all parts of the country, and the varied aspects of panel practice due to local circumstances. The fact that there is no direct representative of the northern part of England on the Medical Advisory Committee to the Insurance Commissioners is pointed to in the Memorandum as an example of imperfect representation which it proposes to avoid by a carefully devised and democratic system of election. Into the methods of securing such complete representation now submitted in outline it is not necessary to go, for all proposals made at the outset will, no doubt, be subjected to criticism and possible improvement, should the aim of the Association in securing general support from the Panel Committees be obtained. The Memorandum proposes that the main functions for which its executive committee, when elected, shall be specially adapted, are as follows:—(1) Negotiation in the interests of panel practitioners, when required and when this is entrusted to it by the constituent members of the Association; (2) the collection and dissemination of information for the benefit of Panel Committees with regard to such topics as new or proposed legislation and regulations; (3) consideration of the course of events of interest in different districts; and (4) the issue of a panel journal entirely devoted to panel affairs. The developments of panel practice to be expected, and such consequences as may follow upon the formation of a Ministry of Health, are pointed to in emphasising the Association's appeal to the Panel Committees to unite themselves without delay by joining it. That this appeal is made at an opportune moment is undeniable, for it is obvious that the situation is one full of anxieties for the panel practitioner, as well as being full of promise of an increased part to be played by him in the conservation of the nation's health. The financial proposals of the Association are not yet a fair subject for comment. A somewhat ambitious programme of possible expenditure is set forth in the Memorandum, but as to that, and as to the possibility and means of fulfilling it, the Panel Committees which may decide to join the Association will be well qualified to judge for themselves.

Annotations.

"Ne quid nimis."

THE THREAT OF SMALL-POX.

As our readers are aware, there have been recently a number of cases of small-pox in this country. We understand that, so far, some 34 cases have been notified—i.e., 28 in London, 3 in East Ham, 2 in Hull, and a suspected case in Nottingham. In the official figures, given on p. 514, one more case is credited to the London area. The distribution of the disease in London was rather widespread, six of the metropolitan boroughs having been invaded with the following number of cases in each: Stepney, 20; Hackney, 3; Bethnal Green, 2; Poplar, 1; Deptford, 1; and Lambeth, 1. Small-pox first made its appearance in Stepney. A little girl, aged 6 years, died in that borough on Feb. 13th as a result of an illness which was diagnosed as "pneumonia." As it was subsequently ascertained that a number of scabs were present on her body, it is possible that she may have suffered from an unrecognised attack of small-pox. This supposition is strengthened by the fact that the date of onset of her illness and other attendant circumstances suggest that she was the probable source of infection of a considerable number of the subsequent cases. It is known that this child passed several hours in an air-raid shelter on Jan. 21st, and as she sickened some 13 days later it is possible that she acquired infection from some unrecognised case of small-pox present in the shelter on the night in question. The sanitary authorities and boards of guardians of the invaded areas have taken all necessary steps to ascertain the source of infection of each case and to limit the spread of the disease. Many persons have been vaccinated by the public vaccinators, and a station for public vaccination has been opened in one of the affected districts. The occurrence of this group of cases in London and East Ham during the past few weeks has prominently brought into notice the public danger arising from neglect of vaccination. More than half the children born are escaping this protection, and though, as we are told, for some years to come the proportion of the total population which is unvaccinated will be much smaller than this, and the average vaccinal condition of the male adult population will be much improved by the vaccination of soldiers during the present war, none the less, the existing indifference as regards safeguarding, more particularly, the child population is a ground for grave concern to those who appreciate the risks involved. Small-pox has not attained the dimensions of a serious epidemic in London since 1902; as recently as seven years ago, however, upwards of 60 cases were notified in East London during the February and March of 1911; and a group of 10 cases was encountered in West London in 1915. The diffusion of small-pox in certain parts of Europe has made it most likely that further outbreaks will from time to time occur during the next two or three years, and during the present year cases have been brought into the busy centres of Swansea and Hull. The urgent need for protection by recent vaccination of all those likely to be brought into relation with sufferers from the disease is thus rendered apparent; in East Ham a nurse has already been numbered among the victims. A special source of risk is, moreover, at the present time operating.

owing to the congregation in air-raid shelters and tube stations of all sorts of people from everywhere, and especially of aliens from the East of London. Fortunately the danger from that quarter has not so far attained formidable proportions, and it is still permissible to hope it will be effectively checked, but even so there still remains the certainty of repeated reintroductions of small-pox into London for some time to come. It is therefore imperatively necessary that all those whose avocations expose them to special risk should renew their protection, and it is further a counsel of common prudence that everyone who habitually uses the ordinary means of transit, and is thus frequently brought into the presence of possible contacts of imported cases, should secure the absolute immunity from small-pox which recent vaccination affords. In the event of the present, or any subsequent, outbreak attaining serious dimensions, the question of forthwith protecting the child population of London generally would become one of special urgency.

THE HOME OF RECOVERY, GOLDERS GREEN.

THE correspondence in the *Times* which arose out of a report of the speech of Mr. Hodge at Worcester has again directed public attention to the difficulties of dealing with the problem of the neurasthenic pensioner. In Mr. Hodge's opinion a system of hospitals devised only for such cases was not the best method of treatment. "He wanted neurasthenic cases mixed up with other cases, so that the cheery chap might shed some of the sunshine of his presence over those suffering from neurasthenia." We are not prepared to deny that in a limited number of cases the method on which Mr. Hodge relies may have proved effective, but it is a method which is by no means applicable to all. The neurasthenic patient does not mix well with other cases. In regard to soldiers suffering from functional nervous disorders, Professor Elliot Smith has drawn attention to the advice tendered by a neurological conference summoned by Sir Alfred Keogh in October last. The findings of that conference have been accepted by the War Office, and roughly they may be summarised in a recommendation that all soldiers suffering from a functional nervous disorder should be segregated for treatment into special hospitals immediately on their arrival in this country, and that these hospitals should be staffed by medical officers interested in, and specially trained for, this work. Experience has shown that in this way the best results are obtained among soldiers, and had this principle been recognised and acted upon at an earlier stage in the war the number of neurasthenic pensioners with whom we have now to deal would not be so large as it is. The problem how best to treat the neurasthenic pensioner is indeed a difficult one to solve. All have been invalided as unfit for any kind of military service, but the degree of their incapacity for civil occupation varies greatly. Each must be treated according to his individual requirements. Some only require "convalescent" treatment, or are suitable for boarding out as guests in country homes, as Dr. T. W. Lumsden has insisted, or in "village centres" on the scheme which has the support of Sir Robert Armstrong-Jones and Sir George Savage. Such schemes are no doubt suitable for a carefully selected number of neurasthenic pensioners who do not need constant medical supervision. But there remains a large number of men who have passed through numerous military hospitals both abroad and at home, and have been on the sick list for periods varying from several months up to two and a half years. At the time of their discharge they are quite unable to make a living, and many of them are unfit to return to their own homes. We believe that "special hospitals" are required for a proportion of these. Some can be benefited by treatment as out-patients at such a clinic as has been established at Lancaster Gate, but many require more or less lengthy treatment as in-patients in special "homes of recovery," a point which is recognised in the new departure announced as intended by the National Hospital for the Paralysed and Epileptic. Dr. E. G. Fearnsides, in a paper an abstract of which was published in THE LANCET for March 23rd, gave full details of the essentials of the treatment carried out at the Home of Recovery, Golders Green, of which he is the medical superintendent, and whose lines are to serve as the model of the Home of Recovery projected by the committee of the National Hospital. The results at Golders Green show that 66 per cent. of the men who were treated to a conclusion returned to work, and a further 24 per cent., making 90 per cent in all, were rendered fit for work. In face of these eminently satisfactory and encouraging results it is difficult to understand why Mr. Hodge in his Worcester speech should have said that it was ridiculous to send "shell-shock" cases to Golders Green, and that "he hoped that in a short time that particular hospital would be used for entirely different purposes." The opinion of the patients at the home on the matter is sufficiently expressed in the resolutions which they spontaneously and unanimously signed and sent to the committee of the Home of Recovery—we repeat them although they were published last week in a letter sent to us by Mr. Charles Drummond, chairman and treasurer of the Hospital for Epilepsy and Paralysis, Maida Vale, of which the Home is a branch:—

1. That we, the undermentioned patients at the "Home of Recovery, Golders Green," having benefited, and in many cases recovered, desire to express our contentment and satisfaction with remaining in this institution, having the utmost confidence in Mr. Burleigh, the medical officers, and the conditions generally of the hospital. Our past experiences in general hospitals have taught us to appreciate being separated from other cases, especially from the so-called "cheery man."

2. That all patients are agreed that after their experience of other hospitals and the company of the so-called "cheery chap," they prefer to risk the air-raid results before that of going to another hospital.

The reference to "air raids" is of interest, seeing that Mr. Hodge's ostensible reason for criticising Golders Green was the outcry against the cruelty of sending "shell shock" cases to institutions within the air raid areas. In our issue of Feb. 9th a letter appeared, signed by Major R. Worth and Lieut. T. A. Ross, in which they stated, from experience at —— War Hospital, London, that "the amount of hysterical manifestation in any ward is an index of the competence of the medical officer in charge..... If he (the hysteric) is encouraged to think he must be bad after an air raid, he will be bad after one..... If, on the other hand, the reason why a noise is disturbing to the war hysteric is explained to him ..... he can soon be shown that an air raid for a man in a well-built house is only a noise—a noise with so many emotional associations that he may easily tremble while it is going on, but not one which need make him have any symptoms the next day." The result of such methods of treatment in wards under their care was that the majority of the patients remained in their beds during air raids instead of getting up

and going into a subway which all knew they might do, and a large number remained asleep, although the noise of the guns was very loud indeed. Precisely similar treatment is followed by equally good results in well-managed institutions for neurasthenic pensioners, where re-education of the patients in self-control, self-reliance, self-respect, unselfishness, and manliness is the aim. A proof of their fitness for normal life is that they no longer behave as our grandmothers were wont to do whenever they heard, or thought they heard, a gun go off. We regret that the opinions of the Minister of Pensions are in direct opposition to those held by persons who have every right to speak with authority on the subject. We should welcome the formation of an Advisory Medical Council, foreshadowed in these columns already, on which would sit representatives of the various branches of medicine called upon to render aid to the pensioned sailor and soldier.

THE TREATMENT OF CARRIERS OF AMŒBIC DYSENTERY.

DURING the past 18 months considerable progress has been made in the treatment of carriers of amœbic dysentery. Careful laboratory control of the treatment of such cases, entailing large numbers of examinations by experienced protozoologists, revealed the fact that injections of emetine failed to eradicate the amœba of dysentery in a large percentage of cases infected with the protozoon. Experimental studies by Dr. H. H. Dale, promised greater success from the employment of the double iodide of emetine and bismuth. So encouraging were the results first obtained that a detailed study of the action of this drug in the treatment of amœbic dysentery was instituted in military hospitals in this country and abroad, the laboratory control of the cases being made possible by the activities of the Medical Research Committee. In THE LANCET of July 21st, 1917, we published a report on the treatment of 102 amœbic carriers with emetine bismuth iodide administered in the form of keratin-coated tabloids. The authors, Captain W. Waddell, R.A.M.C., Captain C. Banks, R.A.M.C., and Messrs. H. Watson and W. O. Redman King were able to claim successes to the extent of 75 per cent. of their cases. In a later report from Mr. D. G. Lillie and Captain S. Shepheard, R.A.M.C. (T.), which was published in THE LANCET of Sept. 15th, 1917, it was shown that still better results may be obtained by the administration of the drug in the form of salol-coated pills. Moreover, the incidence of vomiting was much reduced by administering the drug in this form. In THE LANCET of March 16th, appeared a report from Captain H. L. Watson-Wemyss and Mr. T. Bentham, who claim a still further improvement in the method of treatment by combining injections of emetine with the oral administration of emetine bismuth iodide. The report actually deals with 30 cases and the authors are able to claim success in 90 per cent. of the cases after a single course of the combined treatment. In our present issue we publish another contribution to the subject by Captain Shepheard and Mr. Lillie, who give their experience of the value of the South American herb chaparro amargosa and of simaruba bark. It is interesting to note that all but one of the cases treated by them with these preparations were persistent carriers of *Entamœba histolytica*, who had resisted treatment with at least two courses of emetine bismuth iodide. Even so careful laboratory tests and clinical observation allow these observers to claim as many as 42 per cent. of cures from administration of the various preparations of the drug. All the above observations genuinely advance our knowledge and it is to be hoped that opportunities will be afforded for the further scientific study of the treatment of carriers of amœbic dysentery, and that such study will reveal a method of treatment which shall be wholly successful. We are glad to note the intimate relationship between the wards and the laboratory in the above researches. The laboratory tests must be in the hands of thoroughly trained workers who should be in close communication with the physician in charge of the case. The latter's most important functions are to see that the treatment is truly carried out in every detail, that the laboratory is supplied with specimens accurately and regularly, and that all relevant changes connected with the signs and symptoms of dysentery in any individual case are forthwith communicated to the actual examiner of the excreta. Only by such close working will wholly satisfactory results be obtained.

PREVENTIVE AND CURATIVE TREATMENT OF TYPHOID FEVER BY IODISED VACCINES.

WITH the object of eliminating or modifying the local and general reactions, which sometimes assume serious proportions, following antityphoid vaccination, and of thus rendering it more suitable and applicable to the civil population, Dr. Ranque and Dr. Senez[1] have since 1911 instituted a series of researches for the purpose of obtaining a vaccine of feeble toxicity, which, having an immunising value at least equal to those in general use, should possess the advantage of producing no appreciable reaction. Such an atoxic preparation is equally interesting with regard to its therapeutic use during the course of typhoid infections. These advantages seem to be realised in the peculiar atoxicity of vaccines sterilised by iodine. Their observations may be summarised as follows:—

In a series of experiments in which different samples of the same emulsion of Eberth's bacillus were placed in contact with iodised solutions more and more feeble, it was noticed that with a high percentage of iodine, from 0·20 g. to 0·12 g. per cent., the bacilli had a tendency to become shapeless and swollen above their normal dimensions. With from 0·08 g. and 0·06 g. per cent., on the other hand, these changes were no longer perceptible, and under the microscope it was impossible to distinguish between the bacilli submitted to iodisation and those emulsified with salt solution. When bacterial emulsions left in contact with the iodine solution in decreasing proportions were cultivated in bouillon, development was only observed in the cases where the iodine was present in less than 0·0025 g. per cent. With this strength and above it the action of the antiseptic during 30 minutes was sufficient to prevent the reproduction of the germs. Thus, between the two extremes of 0·06 g. and 0·0025 g. per cent. there was a relatively extensive zone in which investigations could be made to ascertain the "optimum" dosage of iodine for the attenuation of toxic substances, and Dr. Ranque and Dr. Senez found by their experiments that this was 0·02 g. per cent. for Eberth's bacillus and 0·03 g. per cent. for paratyphoid A and B bacilli.

As the result of preventive inoculation by this iodised vaccine among the Annamite troops in 1917 it was found that violent reactions occurred only in 1·5 per 1000 and slight reactions in only 17 per 1000, while out of 20,000 persons thus immunised after one year no instances of typhoid fever occurred, after two years only one benign case, and after three years two mild cases. The dosage

[1] Anales de la Facultad de Medicina, Universitad de Montevideo (Uruguay), October and November, 1917.

recommended was three separate injections of 1, 1½, and 3 c.cm. of a mixed T.A.B. vaccine containing 500 millions per c.cm. of typhoid bacilli and 250 millions per c.cm. each of paratyphoid A and B at intervals of seven days. Dr. Ranque and Dr. Senez also employed these vaccines in the treatment of these diseases, but found doses of 250 to 1000 millions were necessary to produce good results. These injections caused a specific febrile reaction in the course of six or seven hours, which was inoffensive and followed by defervescence. The course of the disease was always favourably modified, the duration being shortened, while complications and relapses were suppressed.

THE LIVER DULLNESS IN GASTRIC OR INTESTINAL PERFORATION.

IN gastric or intestinal perforation gas escapes into the peritoneal cavity, and if in sufficient amount may pass between the liver and diaphragm, obliterating the liver dullness. Considerable discussion has taken place as to this sign, the value of which is much diminished by the fact that it is influenced by other factors. On the one hand, it may be prevented from developing by adhesions, and, on the other hand, it may be present in simple tympanites if distended coils of intestine find their way between the liver and diaphragm. Mr. Rutherford Morison has well summed up the position in the practical rule thus:—

"If liver dullness is present at first and an hour or two later is discovered to have disappeared and become replaced by a tympanitic note, the sign is then of first-rate importance. It signifies the presence of free gas in the peritoneum and a perforation. No other record regarding liver dullness is reliable."

In the *Boston Medical and Surgical Journal* of Feb. 14th Dr. M. T. Field has drawn attention to an important point that appears to have been unnoticed in previous discussions. Obliteration of liver dullness, he suggests, is not so much absolute as relative, and depends on the position in which the patient is examined. He illustrates this point by the following cases:—

In one, a woman, aged 44 years, was sitting on a sofa when first seen. Two hours previously she was seized with severe abdominal pain, but now felt much better. Her pulse was 86 and temperature 97° F. There was moderate tenderness over the whole abdomen, more marked in the epigastrium. Muscular rigidity was not pronounced. Percussion over the liver in the anterior axillary and mammillary lines showed tympany throughout. This, of course, added greatly to the evidence of perforation, though the symptoms were in no way typical. To be certain that no mistake had been made the liver was percussed again, and to my surprise marked dullness was obtained. It then occurred to me that the explanation was difference in the position of the patient. With the patient lying on her left side, fluid, which is always present in a perforation, flowed away from the liver to the most dependent part, while the gas rose to the top and accumulated between the liver and diaphragm. When lying on her right side the contrary occurred, intensifying liver dullness. Operation showed a gastric perforation with considerable free gas and fluid. In another case a man was seen in consultation three days after the onset of the pain. The abdomen was soft, except in the gall-bladder region, and there was tenderness in both iliac regions, but tenderness was most marked in the epigastric and right lumbar regions. The diagnosis which had been made—namely, "gall-bladder or a high appendix"—was not unreasonable. But it seems to me that perforation should also be considered in the second case, where liver percussion gave the same result as in the previous case, and a perforation was found in the first part of the duodenum.

No reliance, however, should be placed on the presence or absence of the liver dullness, unless other signs suggesting an acute abdominal lesion are present. Absence of liver dullness would not be enough to warrant the opening of the abdomen. Also, if liver dullness were present, and other signs suggested perforation, the presence of the liver dullness would not be of the first value as contra-indicative of operation. For example, in a clinical note in our present issue Dr. J. D. Oliver narrates a case of traumatic rupture of the jejunum in which there was no diminution of liver dullness, and very little gas in the abdominal cavity though the perforation was large.

THE FUTURE OF DRIED MILK.

IN the valuable series of food reports issued by the Local Government Board no more important or opportune one has appeared than that published last week, which in the main deals with the case for dried milk. This report, indeed, goes so far as to suggest that, provided the methods of manufacture and conservation of dried milk are carefully conducted, a revolution may be at hand in regard to the present system of distributing milk. The public has been accustomed to look upon milk as a fluid, but modern methods of reducing this fluid to a powder, from which, by the addition of water, milk can be "reconstituted," point to great economical advantages in dealing with a precious food commodity, for dried milk can be placed at the public disposal without the decided drawbacks of perishability. Perishability is the most serious consideration in regard to so many of our food supplies, and perishability is often but a matter of water content. Where the stability of a food can be ensured by simply withdrawing moisture an economic gain to our food-supplies will have been attained. There can be no better example of food wastage than that which occurs in the case of milk simply because it is a fluid. Dr. F. J. H. Coutts, who is mainly responsible for the report under notice, says in his exhaustive inquiry:—

"Liquid milk is clumsy to handle in bulk and inconvenient for transport. With dried milk practically only the solids of milk are retained, hence the labour and cost of transporting the water, which represents about seven-eighths of the total weight of fresh milk, are avoided. Further, dried milk can be put up in packages which are convenient to handle and store. Delay in railway transport, which is disastrous in the case of such a perishable commodity as liquid milk, is not a serious matter in the case of dried milk."

These conclusions are, we think, incontestable, but the question remains whether it is possible to offer the general public a dried milk which for practical purposes is reconstituted by the addition of water into a fluid identical with the original secretion of the cow. It is fairly obvious that such a consummation would mean that the spoonful or two of milk powder stored cleanly and safely in the larder would be all that would be required to keep the domestic milk-supply going for a day. We may with advantage note some of the considerations bearing upon this point which are germane to the Local Government Board Report. Milk is, of course, a fatty food, one-fourth at least of its solids consisting of fat. Accordingly, when dried a powder is obtained containing as much fat as, say, from 25 to 28 per cent. The other constituents—casein, milk sugar, albumin—when kept dry offer no difficulty, but the fat is liable to alter just as butter is, for it is susceptible to bacteriological and to chemical attacks. The latter are in general due to oxidation, of which the slightest degree is rancidity, when the milk becomes offensive in flavour and smell without gross chemical change. This change, however, would not appear

to affect the nutritive value of the milk, but the resulting loss of palatability is nevertheless an important matter. As well-known researches have shown, the attractiveness of food is a very important factor, and it is therefore of the utmost importance that any artificial steps taken to preserve food should leave intact its natural characters, and should not alter for the worse any of its attractive features. Dr. Coutts reviews the various processes for reducing fluid milk to the state of dry powder. These processes practically resolve themselves into (1) concentrating the milk in vacuum pans and rapidly drying the condensed milk on hot rollers; (2) spraying the concentrated milk into a current of hot, dry air. The product of process No. 2 "reconstitutes" on the addition of water better than that of No. 1, chiefly because by this process (No. 1) the fat is largely set free and the casein rendered insoluble. By the spraying process the enzymes are preserved, the casein remains soluble, and the fat still exists as cream and not butter fat, and the product emulsifies readily with water, the resulting fluid, except for a slight "boiled" flavour, being barely distinguishable from normal milk. The keeping powers of both products are limited to some months even when packed in hermetically sealed tins, but it seems that in this respect the powder made by the hot-roller process stands better. In infant feeding there appears to be no dietetic difference of importance between the two products. According to Mr. George Winfield, M.A., of Cambridge, who contributes a report on behalf of the Medical Research Committee on the nutritive value of dried milk, the evidence from weight charts indicates that cow's milk during either process of desiccation loses none of the characters which are necessary for the support of normal growth in infants. The experience of a number of infant-welfare centres is quoted bearing out the value of dried milk in infant feeding, for in the opinion of many authorities one virtue of dried milk lies in the fineness and softness of the curd formed by it, which is so much more digestible than the curd of fresh milk that some infants who cannot digest the fresh or even peptonised milk will thrive on dried milk. The report concludes with an account of the examination of milk powders made at the Government Laboratory, and in its many interesting observations is an excellent piece of work, contributing much of the utmost importance on the problem of an efficient, economic, and abundant milk-supply.

IN the timely report on the prevention of mortality and disablement due to measles and pneumonia in children, which has just been presented to the Local Government Board (New Series, No. 115), Dr. A. S. MacNalty deduces from the available figures the desirability of a number of remedial measures which a study of the medical aspects of the problem leads him to conclude are actually attainable in practice. Dr. S. W. Wheaton's memorandum preceding the report gives some preliminary details of the action already taken by certain local authorities on these lines. Further information on this important side of public health administration is promised, and in the meantime no effort should be spared in inducing sanitary authorities to make use of the powers which they now possess.

THE EMOTIVE RESPONSE OF A CLASS OF 73 STUDENTS OF MEDICINE

MEASURED IN CORRELATION WITH THE RESULT OF A WRITTEN EXAMINATION.[1]

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THE emotive response, or psycho-galvanic reflex, was first systematically studied by Veraguth, and later by Gildemeister, who came to the conclusion that the galvanometric deflection was due to an actual alteration of polarisation. Without, in this place, going into the question of the physical nature of the response, but remarking only that for the purposes of measurement it can be expressed either in terms of an electro-motive force or of a resistance, the present paper is an account of experiments performed on a class of women students of medicine as a result of the following consideration. Persons give an emotive response not only to actual physical sensations such as burning, noise, smell, &c., but also respond electrically in varying degree to apprehension, questions, and to their own thoughts. Thus, if a person is connected in series, by means of electrodes applied to the palm of the hand and any other part, with a cell and galvanometer, the deflection of the galvanometer will alter so as to show an increased current as a result of any of the above-mentioned causes. This suggested to me to seek a possible correlation between intellectual efficiency (as measured by examination) and emotive response to various stimuli. In undertaking the experiments my intention was also to investigate the response on normal subjects and to obtain data as to the variations which are to be expected, which data are necessary before the test can be applied in cases of departure from the normal.

Nature of Experiments.

The apparatus comprised a reflecting moving coil galvanometer, lamp and scale, shunt, calibrating resistance, a Wheatstone's bridge resistance box, Leclanché cell, and zinc disc electrodes of area 10 sq. cm. The electrodes were fixed on the palm and dorsum of the right hand by means of elastic bands, connexion between the electrodes and skin being made by pieces of blotting-paper soaked in strong salt solution. The experiments were performed on 73 medical students at the London (Royal Free Hospital) School of Medicine for Women, whose ages ranged from 17 to 31, the average age being 20. The time of day of experiment varied from 9 A.M. to 6 P.M.

The routine of the test was the same for each student. The apparatus and stimuli to be employed were briefly described, and the subject sat in a chair in view of the galvanometer spot.

The subject resistance was determined by balancing the bridge, and this was repeated before each stimulus; the response to stimuli was measured in scale deflections, which were afterwards interpreted in terms of resistance percentage changes by reference to calibration curves, which gave the relation between deflection and resistance for the different subject resistances and different galvanometer shunts.

The stimuli used were as follows:—

A sharp unexpected bang (mallet on a wooden box); threat to burn the knuckles of the left hand; actual burn by bringing a light from below up to the closed knuckles (the subject being previously instructed to remove the hand as soon as the burn was felt); threat of smell; voluntary inhalation from smelling-salts; series of questions (*re* raids, examination, &c.); unexpected bang similar to the first one.

The students were numbered in the order of the result of a one-hour examination in physics, and the data obtained are arranged in this order in the table, which is divided into two halves, so that the first 37 students are the upper half of the class (Class I.) and the other 36 students are in the lower half (Class II.).

The emotive responses to the various stimuli are expressed in percentage change of resistance, and the actual ohmic resistance at the beginning of the experiment and the

[1] Being part of a lecture delivered in the Physiological Laboratory of the University of London under the authority of the University of London.

changes by the end of the experiment are given in the last two columns. The total average resistance is 7600 ohms and the total average response is 6·29 per cent., or 478 ohms.

Emotive Response in Perceptage Decrease of Resistance.

Class I.

No.	Bang.	Threat burn.	Burn.	Threat smell.	Smell.	Questions. 1	2	3	4	Bang.	Resistance (ohms) (beginning)	Change in resistance.
1	3·7	1·5	5·0	2·8	9 3	1·9	0	1·4	10·0	8·7	4,200	+2460
2	27·5	20·8	4·9	8·5	14·4	5·5	2·8	1·2	—	11·0	5,900	−3050
3	7·1	5·9	3·0	3·5	11·2	2·8	1·2	2·8	3·3	8·4	5,000	− 430
4	9·7	7·2	5·7	3·8	5·7	4·5	4·5	2·0	5·0	7·6	7,500	−1500
5	37·0	9 7	2·5	7·9	5·9	1·6	5·0	8·1	3·2	12·3	6,100	− 850
6	4·4	3·0	1·0	6·4	1·0	2·0	7·6	5 5	—	8·7	6 000	+ 200
7	3·0	6·4	2·9	5·6	7·5	7·4	5·0	8·4	—	9 9	5 000	− 50
8	13·7	5·6	7·1	5·0	1·7	2·7	5·0	15·0	3·5	9·5	17,000	−3100
9	28·4	9·9	11·5	11·5	8·1	15·0	8 5	12·4	6·1	17·7	5,400	− 400
10	14·3	10·5	7·2	4·3	4·4	2·4	8·1	4·9	4·6	10·0	4,150	− 280
11	13·1	16·3	6·1	8·9	12·7	10·7	9 2	—	—	16 3	6.570	− 520
12	4·0	5·7	2·4	2·0	1·4	2·7	—	—	—	6·0	10,500	− 500
13	2·0	1·0	1·0	2·3	0 8	3·4	2·8	3·4	2·3	4·4	3,900	+ 700
14	26·0	8·2	9·6	4·9	10·8	10 3	4·9	9·3	2·1	14·6	11.000	−3500
15	3·0	4·5	1·5	4·4	4·1	2 3	2·5	1·0	2·8	4·0	10,4.0	−1900
16	4·8	12·2	6·7	3·2	8·2	5·5	2 0	—	—	11·0	10,900	− 900
17	24·4	13·8	20·0	15·2	28·0	19·8	14·6	7·4	22·0	21 5	11 500	−3500
18	0	0	1·0	0·5	1·3	0	0	0	0	2·0	12·700	+1800
19	15·5	4·8	10·1	4·1	5·2	5·8	1·3	2·0	6·5	17·8	5.600	+ 470
20	3·1	1·4	1·4	3·0	4·0	4·5	2·6	5·3	1·4	2·6	7,000	−1000
21	6·0	15·0	17·3	15·8	13·2	10·7	12·2	9·0	8·3	22·2	9,700	− 3000
22	22·8	20·1	—	0	3·0	8·5	—	—	—	—	6.500	+ 500
23	12·0	2·9	5·7	3·5	6·2	1·2	1·2	—	—	10·1	10.000	+ 400
24	3·4	4·6	1·9	0	1·5	5·7	—	—	—	j	6,000	− 500
25	3·2	4·6	1·0	5·6	8·4	6·4	4·0	—	—	13 0	6,500	− 800
26	28·2	23·6	6·9	12·7	12·5	14 5	5·7	9·6	—	31·7	11,000	−4200
27	15·7	5·0	3·5	3·3	5·2	3·8	2·3	1·2	7·3	6·5	10,000	− 400
28	7·1	7·6	3·3	6·8	6·2	5·5	3·5	—	—	0·9	6,600	− 400
29	12·2	10·1	7·5	3·7	8·1	0	0	1·5	2 0	11·5	5,550	− 150
30	9·0	12·0	4·5	6 3	7·9	2·0	2·7	1·3	0·6	11·4	5,000	+ 570
31	5·1	8·0	4·0	5·7	6·5	0·7	2·7	—	—	4 6	7.800	−1303
32	15·6	22·6	4·5	12·1	9·5	13·5	6·1	—	—	10 5	7,300	−1800
33	—	3·7	3 2	4·6	3·9	2·6	3 1	3·1	—	5·7	3,240	− 90
34	26·0	14·3	7·1	7·1	5·7	5 7	0·6	1·3	—	5·4	9.000	−2800
35	10·5	11·4	9·2	3·3	10 2	10·2	5·9	—	—	12·2	5,500	−1000
36	23·9	19·4	9·3	14·4	10·3	4·7	10·8	—	—	15·6	9,400	−1500
37	2 7	6·1	5·2	3·0	4·3	3·5	3·5	3·0	3·2	7·6	9,100	−2710
Av.	8·97	8·10	4·73	6·65	6·38	6·27				8·94	7,686	− 981

Class II.

38	3·2	9·4	3·0	0	4·4	3·0	—	—	—	2·4	5,500	− 100
39	6·9	2 0	3·0	0·5	6·9	2·1	2·6	3·1	—	6 9	4,000	+ 300
40	18·2	9·6	8·1	2·4	2·9	1·8	5·8	3·5	6·6	12·0	7,000	−1800
41	6 3	11·4	5·8	6·2	4·5	4·7	4·6	—	—	11·4	15,500	0
42	9·4	9·1	4·3	2·1	3·0	2·6	3 1	—	—	7 0	7.700	−1000
43	5·0	6·5	6·5	1·9	2·3	1·4	1·1	—	—	13·6	6,700	+ 500
44	37·0	7·7	9·2	7·7	4·5	1 3	2·8	4·5	3·6	25·5	10,400	−2400
45	26·4	12·0	12·0	12·2	29·3	4·5	4·3	0·3	—	25·5	9,000	+ 500
46	8·0	7·1	3·1	6·5	10·8	9·0	8·5	6·5	4·0	6·2	5,900	−3600
47	1·8	2·4	1·3	0·5	3·0	2·4	0·7	1·3	—	8·4	5,000	+ 800
48	6·3	3·1	2·3	3·2	7·9	4·3	4·1	2·4	0·5	5·3	4,600	−1000
49	5·9	7·4	1·1	5·9	4·4	2·0	1·1	—	—	8·4	4,700	+ 500
50	3 6	3·2	0·7	5·9	7·3	5·8	5·9	3·7	3·2	8·8	8,100	−1100
51	28·5	0·4	3·8	0	2·2	2·8	0	0	6 0	9·5	9,000	0
52	9·7	3·7	2·3	1·8	3·6	1·8	—	—	—	—	19,000	−4000
53	6·2	5·0	5·7	2·2	5·0	0·1	—	—	—	3·5	3,200	+ 470
54	5·7	5·8	3·7	1·0	3·0	1·0	1·5	—	—	5 1	5,500	− 200
55	15·8	6·3	2·0	1·0	8·0	2·5	4·5	3·8	0	10 3	14,400	−4700
56	10·4	5 6	7·4	4·1	4·2	4·9	5·2	—	—	7·8	12,200	− 500
57	16·3	22·0	9·2	12·9	15·5	9·1	5·7	—	—	18·5	8 000	− 500
58	5·0	4·6	1·8	1·8	1·8	1·0	—	—	—	—	6,400	0
59	13·4	6·5	3·8	9 6	8·4	7·0	5·4	6·8	8·1	15·0	7,500	− 900
60	2·4	1·8	1·8	1·3	1·1	1·6	2·4	9·8	—	3·0	6,000	+1000
61	2·0	4·7	2·1	2·6	3·8	3·0	—	—	—	3·9	3,400	0
62	11·0	12·0	12·0	1 2	5·2	3·7	7·5	—	—	10·5	3,400	+ 100
63	2·1	1·0	1·8	0·7	0·7	1·5	—	—	—	2 1	11,700	0
64	6·5	9·6	5·0	2·5	3·9	5·5	—	—	—	7·5	4,900	− 600
65	10·5	9·7	7·5	3·1	2·1	3·6	—	—	—	8 4	4,200	0
66	9·6	3·5	3·6	4·1	5·1	3·3	2·1	—	—	8·1	4,500	− 100
67	8·5	7·0	2·5	6·4	7·6	2·5	3·6	—	—	4·6	3,150	+ 50
68	10·0	15·0	16·8	8·0	11·3	8·6	—	—	—	26·0	6,700	+1000
69	20·5	5·5	5·8	2·8	5·1	11·7	—	—	—	11·7	14,000	−5000
70	5 5	13·2	4·2	6·0	9·7	2·7	1·9	6·1	3·3	12 9	10 900	− 200
71	23·0	5·5	9·1	20·5	41·0	31 0	—	—	—	15·0	10,000	0
72	3·0	3·0	2·7	3·9	4·8	4·2	4·6	3·2	3·6	7·0	3,800	− 210
73	16·0	6·1	5·8	1·5	2·5	7·4	2·7	—	—	13·3	4,400	− 500
Av.	7·32	4·93	4 58	3·88	5 28	4·01				7·9	7,509	− 750

Consideration of Results.

A preliminary survey of the data shows big variations between different subjects (1) in actual resistance; (2) in "permanent" change of resistance during experiment, which sometimes increases, sometimes decreases; (3) in emotive response; (4) in emotive response to the same stimulus (bang) at the beginning and end of experiment.

With regard to the actual resistance, many factors have to be considered. Thus I find that the resistance with a weak physiological salt solution is four or five times as great as with a saturated solution; that the resistance is much higher when a subject is fatigued and will alter with the time of day. With regard to the change of resistance the bigger the current through the subject, due either to using more cells or to the subject having a lower resistance, the greater is the tendency for the resistance to decrease. The explanation is, no doubt, physical, and I suppose there to be two opposing factors—"electric soakage," diminishing the resistance, and "polarisation," increasing it.

An analysis of the data brings out a correlation between the electrical quantities measured and the percentage number of examination marks.

The average emotive responses to the various stimuli for Class I. and Class II. are plotted in the figure below, and an examination shows:—

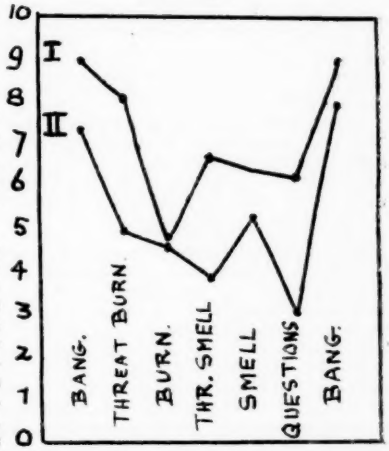
1. That for each stimulus Class I. responds on an average more than Class II.

2. That the apprehension to the burn is considerably more effective than the actuality for Class I. and only slightly more effective for Class II.

3. That the apprehension of the smell is rather more effective than the actuality for Class I. and considerably less than the actuality for Class II.

4. That the response to the questions is much greater in Class I. than in Class II.

Emotive Response: Per Cent. Decrease Resistance.



Average emotive response for first and second class of students. Total average resistance, 7600 ohms; total average response, 6·29 per cent. or 478 ohms decrease.

5. Finally, that the average response to the noise at the beginning and end of the experiment is very nearly equal for each class respectively, showing that there is a real average reaction to noise in spite of individuals varying to the first and second bang.

We may summarise the above experiments into one broad statement—namely, that an intellectual efficiency is in some degree associated with higher nervous sensitiveness as measured by the electrical emotive response for different stimuli; and also that the ratio of the response to "suggestion stimuli" (apprehension and questions), to the response to physical sensation (noise, burn, smell) is relatively greater for Class I.

The above experiments were performed on a population who must be considered above the average, and it will be interesting to obtain data on other sets of persons to compare with this first set. It is to be noticed that although in above experiments there has been established a certain relation between emotive response and efficiency as measured by examination, yet it is emotion and excitement, not intellectual effort, that is made apparent electrically. Thus, reading a book on mathematics or working out a problem produces no effect on the galvanometer, or rather, if anything, it has a soothing effect which may be apparent as a gradual quieting down—i.e., gradual increase of resistance.

As regards the means taken to measure intellectual efficiency—viz., an hour's test paper in physics, I am, of course, aware that this gives a very incomplete idea of a person's ability; it is, however, a better indicator than one would perhaps be disposed to allow—that is to say, as a rule, a student who is prominent in student committee work, who answers an essay question with ability, and who does well in further studies will be found in Class I., not in Class II.

IRELAND.

(FROM OUR OWN CORRESPONDENTS.)

Unicersity College, Cork, and a Munster University.

AT a meeting of the governing body of University College, Cork, presided over by Sir Bertram Windle, the following resolution, proposed by the Most Rev. Dr. Cohalan, Lord Bishop of Cork, was unanimously carried:—

"The governing body of University College, Cork, many of the members of which have been associated with it since the Irish Universities Act of 1908 came into operation, desires to state that in its opinion the success of the College as an institution of higher education in Cork is seriously hampered by its position as a member of a federal university. This entails not only great inconvenience owing to the distance between Cork and Dublin, the centre for university meetings, and an unnecessary waste of time and money caused by journeys for the same, but also owing to the dissimilarity of local conditions limits the development of the college in directions which the governing body believes would be to the advantage and prosperity of Munster.

The governing body therefore calls upon the Government to introduce the necessary legislation in order to constitute an independent university in place of the present dependent college, and in making this request it desires specially to emphasise the great industrial developments which are now taking place in Cork; the further expansion which may be hoped for after the war; and the urgent necessity which exists that the College should be in a position to take the fullest advantage of these developments and to give them the maximum assistance."

Letters were read from the Archbishop of Cashel, the Lord Mayor of Cork, and the Limerick County Council, warmly approving of a separate university for Cork, and resolutions were carried unanimously for the appointment of committees to settle the details of the whole proposition.

Medical Libel Case.

At the spring Belfast assizes two Belfast doctors were involved in a libel case, the plaintiff being Dr. William Minford, a general practitioner, who is a certifier on the Insurance Panel, and the defendant, Dr. John McElroy, medical officer of the Presbyterian Health Insurance Society. The alleged libel was contained in a letter written by defendant to plaintiff, dated Nov. 20th, 1917, and it was contended that the words in this document were intended to mean that the plaintiff had neglected his duty as a medical doctor and medical certifier; had issued false medical certificates, and had been guilty of conduct unbecoming in a doctor, and such as would render him liable to censure from the "British" Medical Council. The defence was that the words did not mean, and were not intended or understood to mean, that plaintiff had neglected his duty, or defaulted in the ways suggested, and that they were incapable of the alleged meanings, or of any other defamatory or actionable meaning. The words were written, it was contended, without malice in the honest belief that they were true, on a privileged occasion, and in such circumstances as made them a privileged communication. On the second day of the trial the case came to a conclusion; the defendant having, through his counsel, withdrawn unreservedly any statement in his letter which was even capable of conveying any imputation against plaintiff, and agreed that the plaintiff should be indemnified against the costs of the action. The defendant accordingly agreed to pay plaintiff a sum for costs.

Queen's University of Belfast.

There are now three candidates for the honour of representing the University in Parliament—namely, Sir William Whitla, Mr. R. T. Martin, and Mr. R. M. Henry, the professor of Latin.

Royal Victoria Hospital, Belfast.

At the annual meeting of the Royal Victoria Hospital, Belfast, held last week, the Lord Mayor presiding, a most satisfactory report was presented, showing that the work done by the institution during the year formed a record in its history. There were 2440 in-patients received during the year, of whom a large number were sailors and soldiers, and 26,882 new out-patients. The receipts of the year exceeded the expenditure by £1500—a wonderful balance-sheet when every article has so risen in price. During the 12 months under review the general subscriptions increased by over £3700, or 90 per cent., while the workpeople added 33 per cent., or over £2000, to their annual contributions, a result due to the work of a new committee called the "Financial Aid Committee," who have worked splendidly and successfully to help the hospital financially. The total cost per patient per diem was 4*s.* 11*d.*, while during the previous year it was 4*s.* 4½*d.*; in other words, the annual cost of each patient increased from £80 to £90 per annum, compared with the pre-war rate of £64 per annum.

Presentation to Mr. C. J. Milligan, of Belfast.

Mr. C. J. Milligan, who has for a quarter of a century been in practice in Ligoniel, one of the environs of Belfast, has been presented by his patients and friends with an illuminated address and a cheque, as an expression of esteem and congratulation at his recovery from serious illness. Mrs. Milligan was associated with the occasion by receiving a silver salver.

April 2nd.

CANADA.

(FROM OUR OWN CORRESPONDENT.)

Venereal Diseases in Ontario.

THE Legislature of Ontario is grappling with the control of venereal diseases. A Bill has passed its second reading providing the machinery, and it will be administered under the chief officer of health of that province. The Bill provides that every hospital receiving aid from the province will be required to make provision for the examination and free treatment of persons suffering from venereal diseases. Where officers of health have reason to suspect that someone is a danger to the community from these diseases he may require such person to produce a certificate from a qualified medical man. The Bill provides, generally speaking, that no one except a duly qualified medical man shall treat venereal patients, but there will for the present be no notification of cases to the medical officer of health, as is required for other communicable diseases.

Grants to Canadian Universities.

McGill University, Montreal, has lately received notice that it is to receive $1,000,000 from the Carnegie Foundation, New York, in return for its efforts in war work. The Ontario Government will make substantial donations to the various universities of that province for a similar reason. The Western University, London, Ontario, will receive $20,000 for its department of public health; $15,000 for its medical department. One large grant is to be made to Toronto University of $175,000 and Queen's University, Kingston, will get $80,000.

Tuberculosis in Canadian Soldiers.

In the institutions in Canada established by the Canadian Military Hospitals Commission from the beginning of the war to the end of September, 1917, there have been 2364 cases of tuberculosis—903 from the various military camps in Canada and 1561 from overseas. It is estimated that in addition to these there are about 540 cases of tuberculosis amongst Canadian soldiers in England, which would make the total in Canadian soldiers 2904. The Military Hospitals Commission have up to the present time established eight sanatoria in Canada and a large proportion of the beds in other sanatoria are reserved for military patients.

The Public Health of Alberta.

The Alberta Provincial Government of Canada has passed an Order in Council providing for the transfer of matters connected with public health from the Department of Agriculture to the Department of the Provincial Secretary. Thus the various branches of public health work in the province will be coördinated, and a step be taken towards the establishment of a separate department of public health, especially as all matters relating to the various hospitals of the province will soon be brought from the Department of Municipal Affairs into the Department of the Provincial Secretary.

A Canadian Medical Week.

At Hamilton, Ontario, there will be held a Canadian medical week, from May 27th to June 1st, 1918, when the Canadian Medical Association and the Ontario Medical Association will meet in joint conference. Dr. James McKenty, Winnipeg, the president-elect of the former body, having resigned, Dr. H. Beaumont Small, Ottawa, has accepted the presidency. Dr. Small is thoroughly familiar with the work of the Canadian Medical Association,

having been its treasurer for upwards of 20 years. Dr. John P. Morton, Hamilton, is president of the Ontario Medical Association, and has already arranged many details of the forthcoming meeting.

Medical Students and Military Service.

The following arrangement has been provided for medical students in Canada with regard to compulsory military service. First-year students are liable for military service if physically fit; all other students of medicine are exempted from combative service and are placed in a reserve corps, to be called up in case of military necessity. They will complete their medical training, and upon graduation, if physically fit, be commissioned in the Canadian Army Medical Corps. A similar arrangement has been made with regard to students of dentistry and veterinary science.

The Osler Club.

The Osler Club, in connexion with the medical department of Queen's University, Kingston, Ontario, has been established for the study of the history of medicine and the foundation of a historical museum. Fifth-year students attend the debates, and one interesting resolution has already been passed, to the effect that the Canadian tuberculosis sanatoria, as at present conducted, have outlived their usefulness.

March 13th.

ROYAL COLLEGE OF PHYSICIANS OF LONDON.

Meeting of Comitia.

AN ordinary Comitia was held on March 25th, Dr. SAMUEL WEST, the Senior Censor, being in the chair, in the absence through illness of Sir Frederick Taylor, the President.

The President's annual address was read by the Registrar, Dr. J. A. ORMEROD. A long list of the honours and decorations conferred upon the Fellows, Members, and Licentiates of the College was presented, including a large number for war services and the baronetcy conferred upon the President. The lectures delivered at the College and the awards of medals, prizes, and scholarships during the year were then referred to. The chief proceedings of the various committees and boards of the College were next briefly reviewed. Obituary notices of the eight Fellows who had died during the year were then read—namely, John Edward Squire, John Roberts Thomson, Thomas Tillyer Whipham, William Julius Mickle, Henry Maudsley, Sir George Hare Philipson, Fleming Mant Sandwith, and James Watt Black.

A vote of thanks was accorded to the President on the motion of Sir DYCE DUCKWORTH, seconded by Dr. NORMAN MOORE, with a request that the President would allow his address to be printed.

Election of President.—It was understood that Sir Frederick Taylor did not desire re-election on grounds of ill-health. A ballot was taken, when Sir Frederick Taylor and Dr. Norman Moore received an equal number of votes. A second ballot was then taken, and Dr. Norman Moore was elected President of the College. The Senior Censor then inducted him into the chair and presented him with the insignia of the office. The newly elected President gave his faith to the College and expressed his thanks to the Fellows for electing him. He referred with regret to the conditions which rendered the late President unwilling to be re-elected.

A gift of a pair of scales, formerly the property of Edward Jenner, was received from Mrs. John Abercrombie.

A report from the Committee of Management was received and adopted, as follows:—

1. That inasmuch as the South African College, Cape Town, is to become the University of Cape Town on or about April 4th, the courses of instruction in chemistry, physics and biology, anatomy and physiology, hitherto recognised by the Examining Board in England when given at the South African College, be recognised under the constitution of the new University.

2. That the examination in chemistry, physics, and biology for the degree of Bachelor of Science of the University of Cape Town be accepted in lieu of the First Professional Examination of the Examining Board in England in those subjects.

3. That the Western University, London, Ontario, be restored to the list of Universities recognised by the Examining Board in England.

TUBERCULOSIS.

The Provision of Hospital Accommodation for Advanced Cases.

THE urgent need of hospitals for advanced cases of pulmonary tuberculosis was the subject of discussion at a meeting of the Tuberculosis Society held on March 25th at the house of the Royal Society of Medicine. Dr. Halliday Sutherland, the president, who opened the discussion, recalled the fact that the Departmental Committee on Tuberculosis (1912) had recommended as the minimum standard the provision of one bed (sanatorium and hospital combined) to every 2500 of population. In England in June, 1916, there was only one bed to every 2973 people. He estimated that of all new cases of pulmonary tuberculosis attending dispensaries 50 per cent. could be treated there, at home, or at open-air schools; 30 per cent. would require sanatorium treatment for an average period of six months, with subsequent treatment at a farm colony in a third of the cases; 20 per cent. would be in the advanced stages of the disease, and for one half of these, living in small overcrowded houses with the great chance of infecting others, tuberculosis hospitals were a necessity. On this basis more than 2500 hospital beds were now required in Scotland, and at least 9000 in England and Wales. Outside the Poor-law he did not know of more than 600 such beds in England and Wales, and because no greater provision had been made sanatoriums for the most part were filled with advanced cases. A tuberculosis hospital of 20 beds should, he said, be created in the vicinity of every tuberculosis dispensary, providing 7420 beds for advanced cases within easy access of their homes under the medical control of the tuberculosis officer for the area. In addition to hopeless cases these hospitals would admit patients for observation and special treatment. In the discussion which followed Mr. Herbert Woolcombe, of the London Charity Organisation Society, while agreeing with the need for institutional treatment, preferred the use of the word home rather than that of hospital. Provision must, he said, be made for the support of the patient's family. The matter was one of great urgency, and was being considered by the National Association for the Prevention of Consumption. Dr. A. J. Shinnie, tuberculosis officer for Westminster, said that no difficulty arose in inducing patients to enter the guardians' special hospital at Hendon. At the conclusion of the discussion a resolution to the following effect was passed unanimously:—

That the Tuberculosis Society is of opinion that no adequate provision exists for the treatment of advanced cases of tuberculosis; that a tuberculosis hospital should be created in relation to every tuberculosis dispensary; that such hospitals should be under the medical control of the tuberculosis officers; and that the Society will welcome any effort on the part of the National Association for the Prevention of Consumption to bring such hospitals into being.

The Grading of Institutions for the Tuberculous.

The same need is noted in a report by Dr. Noel D. Bardswell to the London Insurance Committee, who, after commenting on the drawbacks of domiciliary treatment, mentions the need of proper grading in the institutional treatment to be provided:—

Perhaps the most unsatisfactory feature of domiciliary treatment is the lot of many cases of advanced and incurable disease. Their home conditions often are frankly bad, constituting a menace to the public health. Panel doctors and tuberculosis officers urge the removal of such cases to the safe conditions of a sanatorium, but this accommodation cannot be spared for them. There remains the infirmary. The prejudice, well or ill founded, against entering an infirmary is widespread and intense. Instances come to my notice continually of patients preferring to live under conditions of poverty, to their certain physical detriment, rather than seek shelter in an infirmary. Most of the requests for milk, eggs, and the like, come from these patients. The provision of beds for treatment of advanced disease is urgently called for.

If further accommodation is provided, I would suggest that the various institutions be graded on the basis of the facilities they offer for the treatment of patients suffering from various degrees and manifestations of tuberculosis. While some are well adapted and equipped for the modern treatment of the slight and more curable cases, others have no such facilities, though they are well suited for the reception of the more advanced and serve as a centre for their education in hygienic habits. If the committee was able to send its patients to institutions specially adapted for the particular requirements of each case a more efficient system of treatment could be built up. This would necessitate the careful classification of cases at the office. Developing this principle further, suitable accommodation should be secured specifically for the case of advanced disease, a class of patient which hospitals and sanatoriums generally are disinclined to admit.

The Economic Classification of Tuberculosis.

The cognate subject of the classification of cases of tuberculosis based on their probable result in regard to economic citizenship is dealt with in a paper which we have received

from Dr. Henry A. Ellis, tuberculosis officer for Middlesbrough. Dr. Ellis classifies his patients into groups according to the probable results to be obtained from treatment: Class I. consists of those with a prospect of complete return to health; Class II. of those who will probably remain somewhat injured in their earning capacity; Class III. of those whose economic value after treatment is presumed to be very small. He writes:—

Unless we know the relative number we can make no financial arrangement to meet the call, any more than we could make preparation for an army if we did not know its size and its relative proportions of infantry, cavalry, and artillery. To make proper arrangements we must know the number we are dealing with. The present estimated arrangement is 1 per 5000 of the population for hospital beds and an additional 1 per 5000 for sanatorium and holiday-home beds. My personal opinion is that Classes I. and II. cannot advantageously be treated in the same institution simultaneously for their own sakes as well as for financial considerations. For their own sakes, as they are probably travelling in different directions: (I.) should get well and remain well after a comparatively short treatment; (II.) even after a much more careful and extended treatment will pass nearly 50 per cent. into Class III. Their natural attitude, their number, and their treatment are on different lines and have a greater divergence than separates Classes II. and III., who, it is now generally recognised, should be treated in different institutions.

Class I., from the mere fact of recognition, generally recover with little or no treatment but rest and fresh air, really a regulated holiday. Class II. require all the treatment and methods of the best equipped sanatoria and the greatest skill available. Classes I., II., and III. should be at present somewhere about approximately equal, and should each require about one bed to 5000 population for accommodation. Class I. will be a growing class as our campaign is successful. The only fact as regards the three classes known at present is that there are not sufficient beds. Further observations will probably show that there is a definite series of early cases who will be much better treated in convalescent homes than in sanatoriums, both for their mental and physical welfare. This more definitely occurs among the working classes. The one thing that most systematically requires to be avoided in these homes is the tuberculous chronic, who often has become a hypochondriac, and undoubtedly does a great deal of harm to other cases by infecting them with his objectionable mentality. These homes should cost about half as much as the average sanatorium costs, all that is needed is to get a satisfactory holiday, with good food, regular hours, ample rest, with freedom from worries. For these early cases and for returned sanatorium cases supervision in their work and homes must become increasingly important; with restriction as to overtime and the removal of resistance-decreasing factors from their environment. These are the cases where the regular attendance at the dispensary is so valuable, so that any retrogression may be recognised early and suitable precautions taken.

The regular sanatoriums, as at present established, should be kept for those cases in which a supervised holiday has been a failure or in which the extent of the disease precludes the reasonable prospect of early return to complete economic efficiency. With these cases longer time is needed and much more accurate supervision and treatment. Most of the present recognised cases with considerable sputum belong to this class, but with the extension of early diagnosis the anterior class will become increasingly important and will require special accommodation. Sanatoriums are often far too elaborate and too rigid in their management and rules for really early cases. Their administration often suggests that the patients are made for the sanatorium, not the sanatorium for the patients. The whole question of sanatoriums will have to be reinvestigated. The number of beds have been doubled and further increases are foreshadowed but the results have not improved proportionally. One important fact has, however, become apparent, that waiting lists are absurd and disastrous and the sooner they are done away the better.

Dr. Ellis concludes with the remark that when a case requires sanatorium treatment to re-establish resistance the need is immediate, and to-morrow is generally too late. While the case is waiting another is held back in its turn and the vicious process continues, with the result that little is achieved.

The London Scheme for Control of Tuberculosis.

Dr. G. H. Dart, tuberculosis officer for the borough of Greenwich, writes that the present divided control of tuberculosis in London is one of the reasons why the London scheme is the most backward in England. Administration is left to overworked dispensaries staffed by medical officers enmeshed in a multitude of forms, figures, and reports to the various authorities and attached to an entirely inadequate system of sanatorium treatment. No worthy provision is made for after-care or for advanced and incipient childhood cases. The Local Government Board has only limited powers to bring backward administrations up to a progressive level. The hospitals are, for all practical purposes, centres of treatment and not of prevention, and complicate administration by not falling into the local areas. Dr. Dart goes on:—

A tuberculosis officer should be in touch with all the tuberculosis work in his district, and his influence over tuberculous persons strengthened in every possible way. To this end he should be made responsible for recommencing treatment. At the present time a physician to a hospital, say in Central London, may see a case from Greenwich and recommend sanatorium treatment. The almoner may, or may not, refer to the M.O.H. for a report on home conditions. Quite possibly the first opportunity the tuberculosis officer has of meeting this patient is when the patient is discharged from sanatorium treatment. On the other hand, and these are the majority in Greenwich, the patient in question may have been to a sanatorium (to several, in fact) and the dispensary officer may have a long-standing knowledge of the case extending over several years, but the patient has obtained a hospital letter and sanatorium treatment is arranged. The question is one of obtaining cooperative systematic treatment and supervision, *and the patient who does not obtain sanatorium treatment from local sources* falls to some extent outside the influence of local administration.

Dr. Dart's conclusion is the reasonable one that all cases of tuberculosis should pass through the hands of the tuberculosis officer, and that he should recommend the form of treatment. This should be made possible for him by seeing that his clerical work is reduced to the minimum. A short clinical statement by the tuberculosis officer, a short statement with the facts of the sanitary conditions and of financial inquiry, should, he thinks, suffice for the central authority, the fact that a case has been sent forward for sanatorium treatment being sufficient evidence that the case was considered suitable. The present disjointed methods interfere with efficiency, the success and failure of antituberculosis measures resting in the final issue with the local authorities and the tuberculosis officers, whose opportunities of obtaining the right treatment for the different forms and conditions of tuberculosis are of the utmost importance for success. Dr. Dart, in fact, claims the right of the metropolitan boroughs to the same self-contained antituberculosis schemes as have been attended with a large measure of success elsewhere.

A County Care Committee.

The Wigan County District Care Committee has continued to do good work in following up cases which have passed through a period of sanatorium treatment. The objects for which the committee stands are stated to be:—

1. To assist in the purchase of the outfit of clothing which patients need when they go to a sanatorium. 2. To provide food and clothes for poor persons who are receiving treatment at home. 3. To provide (on loan) bedsteads, with bedding, for patients who are unable to obtain a separate bed. 4. To assist dependants. In the early stages of consumption the prospects of arrest and cure are usually good. A breadwinner often finds it necessary to continue working, until forced to give in, owing to the needs of the family. A little timely help may sometimes prevent the loss of a life and the breaking up of a home. 5. To secure work for those who are sufficiently recovered. 6. Visiting and friendly advice.

The policy is to render the help necessary to enable the patient to carry out a prolonged course of treatment at home without becoming chargeable to the guardians as paupers. Forty-eight cases have been dealt with directly from the funds at the committee's disposal, while 23 additional cases have been assisted locally as a result of representations made to charitable institutions. Work such as this should form part of every dispensary organisation.

URBAN VITAL STATISTICS.

(Week ended March 23rd, 1918.)

English and Welsh Towns.—In the 96 English and Welsh towns, with an aggregate civil population estimated at nearly 17,000,000 persons, the annual rate of mortality was 16·5, against 16·7 and 16·6 per 1000 in the two preceding weeks. In London, with a population exceeding 4,000,000 persons, the death-rate was 16·9, or 0·9 per 1000 below that recorded in the previous week; among the remaining towns the rates ranged from 6·8 in Exeter, 7·2 in Acton, and 8·5 in Walthamstow, to 31·4 in Blackpool, 33·3 in West Hartlepool, and 35·0 in Barnsley. The principal epidemic diseases caused 596 deaths, which corresponded to an annual rate of 1·8 per 1000, and included 269 from measles, 223 from whooping-cough, 49 from diphtheria, 37 from infantile diarrhœa, 8 from scarlet fever, and 5 from enteric fever. Measles caused a death-rate of 3·3 in Oxford, 3·5 in Leeds, 4·2 in Norwich, 6·2 in Swindon, 6·6 in Great Yarmouth, and 14·8 in Barnsley; and whooping-cough of 1·7 in Rochdale and in West Hartlepool, 1·9 in Hornsey and in Wallasey, 2·0 in Sheffield, and 3·1 in Carlisle. The 956 cases of scarlet fever and 1582 of diphtheria under treatment in the Metropolitan Asylums Hospitals and the London Fever Hospital were 20 above and 34 below the respective numbers remaining at the end of the previous week; there were also 32 cases of small-pox under treatment, including 8 new cases admitted during the week. Of the total deaths in the 96 towns, 164 resulted from violence. The causes of 39 deaths were uncertified, of which 3 were registered in Liverpool, 6 in Birmingham, and 3 each in Leicester, Manchester, and Gateshead.

Scotch Towns.—In the 16 largest Scotch towns, with an aggregate population estimated at nearly 2,500,000 persons, the annual rate of mortality was 16·3, against 14·6 and 13·9 per 1000 in the two preceding weeks. The 340 deaths in Glasgow corresponded to an annual rate of 15·9 per 1000, and included 13 from whooping-cough, 9 from measles, 3 from infantile diarrhœa, and 1 each from enteric fever, typhus, scarlet fever, and diphtheria. The 93 deaths in Edinburgh were equal to a rate of 14·6 per 1000; no fatal case of any of the principal epidemic diseases occurred during the week.

Irish Towns.—The 213 deaths in Dublin corresponded to an annual rate of 27·8, or 5·8 per 1000 above that recorded in the previous week, and included 11 from whooping-cough, 10 from infantile diarrhœa, 5 from measles, and 1 each from enteric fever and diphtheria. The 195 deaths in Belfast were equal to a rate of 25·9 per 1000, and included 20 from whooping-cough, 9 from measles, and 1 from infantile diarrhœa.

Correspondence.

"Audi alteram partem."

AMNESIA AND PAIN.

To the Editor of THE LANCET.

SIR,—Let us clear our minds of catchwords, which just now bring less comfort to the lying-in woman than the blessed word Mesopotamia. "Amnesia" is a vague word, with various applications; it may be doubted whether it is applicable to the mental condition of a parturient woman after the administration of scopolamine-morphia who may be capable of answering questions rationally, of stating that she has pain and giving every sign of being in pain, or, again, be capable of answering questions irrationally or incoherently (just like a person intoxicated with alcohol), and still stating and showing by signs that she is in pain. Because the woman after labour has a true "amnesia," "remembereth no longer her anguish," it does not follow that the labour was painless; such a conclusion would justify operating without anæsthesia on infants and fuddled drunkards. To the writer of the annotation in your last issue I would point out that usually the patient awakes during the pains and consciousness is *not* in abeyance, as is proved by the ability of the patient to answer questions and to state and show that she suffers.

The truth is that "twilight sleep" labour is not "painless labour," and involves increased risk to mother and child.

I am, Sir, yours faithfully,

March 30th, 1918. HERBERT R. SPENCER.

GANGLIONEUROMATA.

To the Editor of THE LANCET.

SIR,—In his interesting account of his case of ganglioneuroma of the mesentery published in your issue of March 23rd Sir John Bland-Sutton makes some rather ambiguous, and I think misleading, statements as to the malignancy of these tumours. In his penultimate paragraph he implies that it is characteristic of ganglioneuromata of the adrenals to display malignancy in its worst forms; so far as our knowledge goes this is not the case. The majority of the tumours hitherto described have shown more or less mature tissue and benign characters and are appropriately named ganglioneuromata. When a second type of tumour of less mature type was described, and its origin from tissue resembling undifferentiated neuroblast appreciated, the name neuroblastoma was coined, adequately expressing the view as to its origin and its malignant nature. Between these two groups are a few cases bridging the gap between the two and showing some of the characteristics of each. Reference to Dunn's paper, which Sir John Bland-Sutton quotes, shows that only two out of ten suprarenal tumours showed malignancy with metastases; and of four cases which have come under my own notice in the post-mortem room and museum at Guy's Hospital two were ganglioneuromata and two were typical neuroblastomata with metastases. Moreover, there is no evidence that the tumours originating in the suprarenals show a really greater tendency towards malignancy than do those from the rest of the abdominal sympathetic system. With regard to age, both types of tumour are much more common in children and adolescents than in adults, and while it is true that the benign mesenteric tumours have been found only in the former, exactly the same can be said of the malignant neuroblastomata whatever their origin.

I am, Sir, yours faithfully,

Kensington, W., March 25th, 1918. GORDON W. GOODHART.

SERUM SICKNESS AND VAGOTONIA.

To the Editor of THE LANCET.

SIR,—In reply to Dr. C. Edgar Lea's question, in his letter which appears in your issue of March 16th, I write to say that neither atropine nor adrenalin was administered in any of my cases of anaphylaxis.—I am, Sir, yours faithfully,

E. W. GOODALL.

Grove Military Hospital, Tooting, March 26th, 1918.

EYE-STRAIN.

To the Editor of THE LANCET.

SIR,—The meaning attached by Dr. Des Vœux to this term is wider than the ordinary one, in that he apparently includes in it cases in which the refraction and musculature of the eyes are normal, the eyes themselves healthy, and the work demanded of them not excessive by ordinary standards. In certain people the multitude of sensations conveyed by the optic nerves to the brain and the rapidity with which they succeed one another, as, for instance, in a crowded room or on a railway journey, appear to be the exciting cause of very distressing symptoms, ranging from indigestion to functional paralysis. By all means send such cases to an ophthalmic surgeon, and many of them will doubtless be helped by the prescription of correcting glasses. Many of them, however, will not be helped by anything except *rest*, and where it is the central nervous system which is primarily at fault it seems to me to be darkening counsel to talk about eye-strain. On the other hand, as is well recognised, there are a vast number of cases not only of headache, but of other affections of the nervous system, where appropriate glasses do a very great deal of good. Here the *main* cause of the trouble is the painful effort to employ the eyes on tasks to cope with which they are not equal, but for which they can be made equal by the wearing of proper glasses. Obviously, it is desirable to be able to form an opinion as to what sort of cases are likely to be so helped. Towards the solution of this problem I would like to make the following remarks.

1. Headaches due to eye-strain generally occur during or after close application to eye-work. If they are worse when the patient wakes up in the morning they are probably not due to eye-strain. I saw a munition-worker the other day who had been told that her headaches were probably due to eye-strain at her work. She told me, however, that in the evenings, which she occupied by learning type-writing and shorthand, she was free from headache. There was no ocular defect and it was obviously *not* a case of eye-strain.

2. The commonest causes of eye-strain are hypermetropia and astigmatism. If low degrees of simple hypermetropia cause much trouble in young people there is generally something wrong with the general health. Low degrees of astigmatism frequently cause headache, but this is by no means always the case. Those in whom these small errors cause most trouble are generally young women of a highly nervous temperament. In some cases I am sure that suggestion plays a part in the cure, and I should be inclined to suspect this in the cases referred to by Mr. Cobbledick where the correction of one-eighth of a diopter gives relief. Myopic cases without astigmatism, when stationary, do not, as a rule, cause headache, but while progressive they do, and must be treated, not only by glasses, but by rest of the eyes.

3. The only error of muscle balance, which is often a primary cause of symptoms, is hyperphoria. Weakness of convergence, which may be relieved by prisms base in, is generally associated with weakness of general health.

4. The connexion between serious diseases of the nervous system such as chorea and epilepsy with eye-strain is too well attested to be doubted. Where the nervous system is in a state of instability we must try to remove all unnecessary stress, and the effort entailed by an uncorrected error of refraction may be just enough to upset the nervous equilibrium of some in whom it might otherwise remain stable.

I am, Sir, yours faithfully,

Weymouth-street, W., March 28th, 1918. A. HUGH THOMPSON.

THE LATE MR. T. H. WADD.—Mr. Thomas Herbert Wadd, who died at Haywards Heath on March 23rd at the age of 79, formerly practised at St. Leonards-on-Sea, but had resided at Haywards Heath for some time as an invalid.

FIRE AT A RED CROSS HOSPITAL.—The recent fire at a Red Cross hospital at East Grinstead resulted in damage being done to the extent of £2000. The origin of the outbreak is unknown, and, thanks to the coolness and resource displayed by Mrs. Edward Blount and her staff of nurses, all the patients were removed without any untoward incident and housed at other hospitals in the town and district. The hospital accommodated 27 cases and 21 beds were actually occupied at the time of the outbreak.

The War.

THE CASUALTY LIST.

THE following medical officers appear among the casualties announced since our last issue:—

Killed.

Capt. H. Dunkerley, R.A.M.C., was educated at Cambridge and at the London Hospital, and qualified in 1914. He joined the R.A.M.C. in the December following, and went to France with the 8th Rifle Brigade. Being wounded he was invalided home, and later returned to the front, at first being attached to a stationary hospital, and afterwards to a field ambulance.

Lieut.-Col. J. Robertson, R.A.M.C., was educated at Aberdeen, Dublin, Hamburg, and Berlin, and qualified at Aberdeen in 1904. He held appointments at St. Mark's Hospital, London, and was medical officer at Dooars in India. Prior to joining the R.A.M.C. he was in practice in Aberdeen, and was on the staff of the Royal Infirmary in that city.

Capt. R. G. McElney, M.C., R.A.M.C., qualified at Belfast in 1915, and joined up shortly afterwards. The award of the Military Cross was recorded in THE LANCET of Dec. 16th, 1916, p. 1034.

Capt. B. G. Beveridge, M.C., R.A.M.C., qualified at Aberdeen in 1912, and was in practice with his father in that city on the outbreak of war. Later he joined the R.A.M.C., and was awarded the Military Cross in November last (THE LANCET, Nov. 24th, 1917, p. 805).

Died of Wounds.

Capt. J. C. Metcalfe, M.C., R.A.M.C., qualified at Leeds in 1912, and was in practice at Liversedge, Yorks, prior to joining up. The award of the Military Cross was recorded in THE LANCET of June 9th, 1917, p. 894.

Temp. Capt. H. T. Lukyn-Williams, R.A.M.C., attached Sherwood Foresters, qualified at Edinburgh in 1911, and previously to joining the R.A.M.C. was at the London Jews Society Mission Hospital at Jerusalem.

Capt. F. Simpson, R.A.M.C., qualified in 1915, and joined up shortly afterwards.

Wounded.

Major M. A. Power, M.C., R.A.M.C.
Major J. F. Robertson, R.A.M.C.
Capt. H. T. Chatfield, R.A.M.C.
Capt. A. S. Hendrie, R.A.M.C., attached R.F.A.
Capt. F. P. Fisher, R.A.M.C., attached K.R.R.C.
Surg. T. D. McEwan, R.N.V.R.
Capt. F. E. L. Phillips, R.A.M.C.
Lieut.-Col. R. T. C. Robertson, D.S.O., R.A.M.C.

CASUALTIES AMONG THE SONS OF MEDICAL MEN.

The following additional casualties among the sons of medical men are reported:—

Lieut. A. A. O. Davenport, M.C., East Lancashire Regt., died of wounds, elder son of Dr. A. F. Davenport, of St. Kilda, Victoria, Australia.

Second Lieut. J. H. Cameron, died from pneumonia contracted on active service, eldest son of the late Dr. J. Cameron, of Lochgilphead, Argyllshire.

Capt. K. Drummond, Northumberland Fusiliers, died of wounds, fifth son of Dr. D. Drummond, of Newcastle-on-Tyne.

Acting-Commander J. S. Schäfer, R.N., killed at sea, elder and only surviving son of Professor Sir E. Schäfer, F.R.S., of Edinburgh University.

Sub.-Lieut. J. F. S. Barton, R.N.D., killed in action, youngest son of Dr. F. A. Barton, of Eldon-street, London, E.C.

Capt. B. G. Beveridge, M.C., R.A.M.C., killed in action, son of Dr. A. T. Beveridge, of Aberdeen.

THE HONOURS LIST.

The following promotions of and awards to medical officers are announced:—

To be Brevet Lieutenant Colonel.—Maj. (temp. Lt.-Col.) R. M. Barrow, I.M.S.; Maj. (temp. Lt.-Col.) M. Mackelvie, I.M.S.
Distinguished Service Order.—Capt. J. Scott, I.M.S.
The Military Cross.—Capt. J. D. Kidd, R.A.M.C.

The acts of gallantry for the following awards will be announced later:— *The Military Cross.*

Capt. A. C. Ainsley, R.A.M.C.; Temp. Lt. V. K. Apte, I.M.S.; Lt. C. W. W. Baxter, I.M.S.; Temp. Capt. W. K. Bigger, R.A.M.C.; Capt. W. E. H. Bull, R.A.M.C.; Temp. Capt. N. M. Cummins, R.A.M.C.; Capt. C. A. Godson, I.M.S.; Capt. W. Goldie, R.A.M.C.; Temp. Capt. B. Knowles, R.A.M.C.; Capt. P. J. Moir, R.A.M.C.; Capt. C. N. Davies, I.M.S.; Temp. Capt. R. Stansfield, R.A.M.C.; Capt. B. M. Tuke, R.A.M.C., Spec. Res.; Capt. R. G. Walker, R.A.M.C.

FOREIGN DECORATIONS.

Italian.

Order of the Crown of Italy: Cavalier.—Temp. Maj. (acting Lt.-Col.) E. F. Elliot, R.A.M.C.; Temp. Capt. R. H. Lucas, M.C., R.A.M.C.

EX-SOLDIERS IN NEW SOUTH WALES.

Communications from the New South Wales Recruiting Committee, whose office is at Sydney, show that efforts are to be made there, as here, for bringing back the soldier to civil life, when his military service is over, in circumstances as favourable as possible to his future. Among the documents before us is a letter, signed R. Septilla Evans, suggesting the formation of a society in every Allied country under the title of the "Foster Mother Society," in which women may interest themselves personally in individual sailors and soldiers who are crippled and incapacitated or who otherwise require their care. In conjunction with the establishment of such a system the writer proposes the organisation of "National Health Reserves" where soldiers could be trained in surroundings conducive to health for industries and pursuits calculated to enable them to gain a livelihood. The writer considers that these health reserves might be situated in "National Forest Reserves," a measure which may be found easier in practice where she has the good fortune to live than in some of the Allied countries to which she appears in part to address herself, but in every country affected by the war efforts should be made according to circumstances in the direction to which she points.

Medical News.

UNIVERSITY OF MANCHESTER.—At examinations held recently the following candidates were successful in the subjects indicated:—

THIRD M.B. AND CH.B. EXAMINATION.

General Pathology and Morbid Anatomy.—May Ashburner, Mary E. Boullen, Mary S. Jones, J. F. O'Grady, Ellis Piggott, and A. el H. Sadek.

SECOND M.B. AND CH.B., EXAMINATION.

Samuel Adler, Kathleen M. Fullerton, Florence M. L. Graham, E. N. Greaves, G. E. Hayward, J. B. Higgins, F. C. Jones, Jessie Kilroe, A. S. Leigh, Gertrude B. Leigh, H. D. Preston, Bertha Renshaw, Annie Rothwell, G. L. Taylor (distinction in Anatomy), and S. J. Woodall.

DIPLOMA IN DENTISTRY.

Third Examination.—Bertram Wilkinson.
Second Examination.—Dental Mechanics: Alan Booth. *Dental Metallurgy:* John Hopkins, Alice Ramsden, and Gracie Walker-Anderson.

UNIVERSITY OF DURHAM: FACULTY OF MEDICINE.—At examinations recently held the following candidates were successful:—

SECOND EXAMINATION FOR DEGREE OF BACHELOR OF MEDICINE.

Anatomy and Physiology.—Norah Hester Hamilton, Eustace Vernon Howard, Leo Norton Knight O'Neill, Mary Foster Richardson, and William Christopher Wardle.

THIRD EXAMINATION FOR DEGREE OF BACHELOR OF MEDICINE.

Materia Medica, Pharmacology and Pharmacy; Public Health; Medical Jurisprudence; Pathology and Elementary Bacteriology.—Sujan Raj Chatterji, Nan Coxon, Leonard Wilfrid Hearn, John Hetherington, James Richard Hughes (second-class honours), Robert Sanderson, and Habib Toma.

QUEEN'S UNIVERSITY OF BELFAST.—Medical degrees were conferred on March 23rd upon the following:—

M.D. DEGREE.

David H. C. Given (*in absentiâ*).

M.B., B.CH., B.A.O. DEGREES.

Donald R. Wheeler (first-class honours), H. E. Magee (second-class honours), William Napier (second-class honours), Marion Crawford, William Gilmore, Joseph G. M. Leyden, Henry T. O'Neill, Hugh J. O'Prey, William H. Pedlow, Samuel J. Smyth, and Ernest S. G. K. Vance.

CONJOINT EXAMINATIONS IN IRELAND BY THE ROYAL COLLEGE OF PHYSICIANS AND THE ROYAL COLLEGE OF SURGEONS.—At examinations held recently the following candidates were successful:—

THIRD PROFESSIONAL EXAMINATION.

A. Cohen, T. N. D'Arcy, B. Spatsin, J. F. Gallagher, S. J. Halpin, J. F. Lyne, M. J. Moloney, T. M. Matthews, W. N. Mosbery, J. Power, I. N. Ryan, M. Toher, N. Waite, and C. E. Wilson.

FINAL PROFESSIONAL EXAMINATION.

William Evans, Charles Kendal Tuthill Hewson, Patrick Joseph O'Connell, Marks Michael Price, Patrick Kevin Ignatius Ryan, James Coulter Smyth, and James Gibson Thornton.

UNIVERSITY OF DUBLIN, TRINITY COLLEGE SCHOOL OF PHYSIC.—At the recent Hilary examinations the following candidates were successful:—

FINAL MEDICAL EXAMINATION.

Part I., Materia Medica and Therapeutics, Medical Jurisprudence and Hygiene, Pathology.—John Henry Coolican (high marks), William Andrew Byrn (high marks), Richard Counihan, Noelle Long, Abgar Read Aldin, William Joseph Hogan and Johannes Tobias Mynhardt (equal), *John William Scharff, *David Shields Prentice, and *Cecil Hugh Keller.

* Pathology (completing examination).

Part II., B.A.O., Midwifery.—William Frederick McConnell, William Sweetnam, Edward Francis Wilson, John Benson McGranahan, John William Scharff, David Shields Prentice, Robert Bevan Nangle Smartt, William Alfred Shannon, Daniel McElwee, Benjamin Damer Merrin, and Francis Assisium McHugh.

B.Ch., Surgery.—Thomas Mulock Bentley, Lindley Albertyn, Frederick Gill and Arthur Leslie Gregg (equal), William Leech Young, Jason Grant Bird, Robert Wallace Nesbitt, and Francis Assisium McHugh.

M.B., Medicine.—Harry Lee Parker (high marks), Victor Millington Synge (high marks), Johannes Cornelis Fouché, Ernest Edward Rollins, Robert Meade Daly Devereux, John Benson McGranahan, Percival Atkin Dormer, Edward Francis Wilson, James Michael Hill and Thomas Hugh Robinson McKiernan (equal), and Francis Assisium McHugh.

DIPLOMA IN PUBLIC HEALTH.

Part I.—Robert Arthur Keane.

CENTRAL MIDWIVES BOARD.—A special meeting of the Central Midwives Board was held at Queen Anne's Gate-buildings, Westminster, on March 20th, with Sir Francis H. Champneys in the chair. Certain midwives were struck off the Roll, the following charges, amongst others, having been brought forward:—

A midwife being convicted upon an indictment for the manslaughter of a child and sentenced to six months' imprisonment. A midwife giving birth to an illegitimate child, and having thereby been guilty of misconduct. Being in attendance at a confinement, and the child suffering from inflammation of, and discharge from, the eyes, the midwife did not explain that the case was one in which the attendance of a registered medical practitioner was required, as provided by Rule E. 21 (5); medical aid having been sought for the child, she neglected to notify the local supervising authority thereof, as required by Rule E. 22 (1) (a). The midwife did not on each occasion when attending the patient wear a clean dress of washable material, as required by Rule E. 2; neglecting to provide for the cleanliness, comfort, and proper dieting of the mother and child during the lying-in period, as required by Rule E. 12; discontinuing her attendance after the fifth day at a time when the child was suffering from a purulent discharge from both eyes, and not taking and recording the pulse and temperature of the patient at each visit, as required by Rule E. 14. The midwife not being scrupulously clean in every way, as required by Rule E. 2; that when called to a confinement she did not take with her the appliances and antiseptics required by Rule E, 3, and did not keep her register of cases as required by Rule E. 24.

THE NATIONAL HOSPITAL FOR THE PARALYSED AND EPILEPTIC.—At the annual general meeting of the supporters of this hospital, held at Queen-square, Bloomsbury, on March 26th, it was reported that at the request of the Ministry of Pensions the hospital had undertaken extensive provision for, and the management of, hospital accommodation for discharged disabled sailors and soldiers suffering from disabilities coming within the special class of diseases treated by the hospital. Two large houses in Queen-square are being converted into an annexe of the hospital containing 30 beds for discharged men. The cases will be primarily chosen from those patients, happily few in number, who are suffering from both epilepsy and paralysis, and the remainder of the beds will be devoted to various forms of paralysis. The board have, in addition, assumed management of Lonsdale House, Clapham Park, a hospital of 25 beds (capable of extension to 30 or more beds) for discharged paralysed sailors and soldiers. Lonsdale House is well adapted for its purposes and stands in extensive grounds. It was handed over to the National Hospital on Feb. 1st completely equipped. Later in the year the hospital will take under its management a Home of Recovery for neurasthenic discharged men, an institution which it is proposed shall be organised on similar lines to the Home at Golders Green, in connexion with the Hospital for Epilepsy and Paralysis. Negotiations are in progress to acquire for the purpose a large house and estate about 25 miles from London, where there will be facilities for the treatment and training of 100 patients.

UNIVERSITY COLLEGE HOSPITAL, LONDON.—At the annual meeting of the Corporation of University College Hospital, Sir Ernest Hatch, chairman and treasurer, being in the chair, the Duke of Bedford was elected President for the ensuing year. Proposing the adoption of the annual report, the chairman said that the hospital had just passed through a strenuous but successful year, although they had had to combat high prices, shortage of labour, and all the extra difficulties and expense consequent upon war conditions. He announced the election to the general committee of the hospital of H.R.H. Princess Marie Louise and Lady (Owen) Philipps, and, in commenting on the fact that the election of women to the committee was an innovation, referred at length to the splendid work done by women during the war. Mr. Raymond Johnson, seconding, said that he would especially draw attention to the work done in the child-welfare section of the hospital, adding that during the year they had had 250 beds given up to sailors and soldiers wounded or incapacitated from the front. The report stated that the total income amounted to £48,599, inclusive of a sum of £15,425 received from the Government towards the maintenance of wounded sailors and soldiers. The receipts from legacies for general purposes amounted to £1756. The endowment fund had been increased by £8400, which included a munificent gift of £6000 from Sir Lucas and Lady Ralli for the endowment of six beds for the treatment of Bright's disease and other kindred diseases, in memory of their son, Captain Leo Ralli.

THE SERVICES.

ROYAL NAVAL MEDICAL SERVICE.

ROYAL NAVAL VOLUNTEER RESERVE.

A. F. Briglmen to be temporary Dental Surgeon.

ARMY MEDICAL SERVICE.

Lieut.-Col. A. W. N. Bowen, D.S.O., to be temporary Colonel whilst employed as Assistant Director of Medical Services of a Division.

Major F. D. Boyd, C.M.G. (R.A.M.C., T.F.), to be temporary Colonel.

ROYAL ARMY MEDICAL CORPS.

Lieut.-Col. L. Way is placed on retired pay.

Major J. C. Kennedy to be Lieutenant-Colonel.

Major R. J. C. Thompson, C.M.G., D.S.O., relinquishes the acting rank of Lieutenant-Colonel on reposting.

Major D. de C. O'Grady to be acting Lieutenant-Colonel whilst in command of a Medical Unit.

Temp. Major H. C. Barclay relinquishes his commission and is granted the honorary rank of Major.

Temp. Major J. G. Hunt, Canadian A.M.C., ceases to be seconded for duty with the Anglo-Russian Red Cross Hospital, Petrograd, Russia, without pay and allowances.

Temp. Major G. Royce, Canadian A.M.C., to be temp. Lieut.-Col.

Temp. Capt. J. A. MacMillan to be temporary Major.

Temporary Lieutenants to be temporary Captains: G. A. Wyon, H. G. G. Jeffreys, E. H. K. Altounyan, M.C., D. A. Crow, W. F. Cornwall, W. McQuiban.

J. MacInnes, late temp Captain, is granted the hon. rank of Captain.

Captains, Canadian A.M.C., to be temporary Captains: G. W. Anderson, M. C. Burke, M.C.

To be temporary Captains: P. A. Sullivan, J. C. T. Teggart, M. P. Scanlon, S. A. Bull, J. E. Rees, S. E. Martin, M. Murphy.

N. M. Keith to be temporary Honorary Captain.

To be temporary Lieutenants: J. T. Cameron, N. S. MacNaughton, C. L. Forde, F. L. Rigby, W. Rigby, T. Ballantyne, T. E. Hill, B. G. Brooke, N. McCullough, C. P. Chambers, E. D. Kinsey, H. K. Waller, G. E. Oates, T. J. Richardson, J. H. P. Vivian.

Officers, Canadian A.M.C., to be temporary Lieutenants: Capts. B. S. Cornell, H. E. Thompson, F. E. Webb, A. B. Earle, C. H. Aylen, W. A. S. Magrath, G. O. Grain, W. E. Brown, C. F. Williams, A. B. Cooke, D. G. K. Garrett, C. J. Miner; Lieuts. W. P. McCowan, C. O. Miller, F. H. Boone, F. Spearing, W. E. Martin, P. R. Shannon, S. Bardal, F. G. McGuinness, T. G. Playford, A. M. C are, R. C. McLaughlin, W. F. Tisdale, T. W. Shaw, H. M. Raphael, R. R. MacGregor.

W. S. Rutherford to be temporary Honorary Lieutenant.

G. L. Gall to be temporary Lieutenant.

V. F. Kroenig-Ryan, late temporary Lieutenant, is granted the honorary rank of Lieutenant.

Officers relinquishing their commissions: Temp. Capts. T. W. Ruttledge, R. J. Mayberry, S. J. Scott, G. J. Arnold (granted the honorary rank of Captain), H. B. Maxwell, S. Potter, E. H. Freeman, G. E. Manning (on account of ill health and is granted the honorary rank of Captain); Temp. Lieuts. A. Welpiv (on account of ill-health and is granted the honorary rank of Lieutenant) and J. McCaig; Temp. Hon. Lieut. C. C. Allen.

SPECIAL RESERVE OF OFFICERS.

Lieut. A. H. Mitchell to be Captain.

A. G. W. Compton, M.C., late Capt., is granted the hon. rank of Capt.

TERRITORIAL FORCE.

Majors (temp. Lieut.-Cols.) W. Macdonald and H. C. Parsons relinquish their temporary rank on an alteration in posting.

Lieut.-Col. W. E. Hume remains seconded whilst holding a temporary commission in the Army Medical Service.

Officers seconded for duty with a General Hospital: Capt. (temp. Major) A. L. Whitehead and Capts. W. Gough, W. W. N. King, G. F. Stones, N. Milner, H. J. Slade.

Capt. R. W. Acheson relinquishes his commission on account of ill-health (granted the honorary rank of Captain).

To be acting Lieutenant-Colonels whilst commanding a Field Ambulance: Capt. (temp. Major) H. S. Beadles and Capt. W. Brown.

Capt. (acting Lieut.-Col.) J. R. Pooler reverts to the temporary rank of Major on ceasing to command a Field Ambulance.

Capt. F. A. Hepworth remains seconded whilst holding a temporary commission in the R.A.M.C.

Capt. (acting Lieut.-Col.) L. West relinquishes his acting rank on ceasing to command a Field Ambulance.

Capt. R. Kyle relinquishes his commission on account of ill-health, contracted on active service, and is granted the honorary rank of Captain.

Capt. G. L. L. Lawson to be Major.

Capt. R. H. P. Crawfurd relinquishes his commission on account of ill-health.

The undermentioned officers retire under the provisions of Para. 116, T.F. Regulations: Major R. G. Hebb, Capt. F. Jaffrey, Capt. E. I. Spriggs.

Capt. W. Cotton is seconded.

The undermentioned to be temporary Majors, Kent Medical Volunteer Corps: W. H. F. Noble, E. C. Warren, F. Brightman.

J. L. I. Moore to be Medical Officer and temporary Lieutenant, 21st Battalion, County of London Volunteer Regiment.

Appointments.

Successful applicants for vacancies, Secretaries of Public Institutions, and others possessing information suitable for this column, are invited to forward to THE LANCET *Office, directed to the Sub-Editor, not later than 9 o'clock on the Thursday morning of each week, such information for gratuitous publication.*

BUCKELL, E. F. W., M.R.C.S., L.R.C.P. Lond., has been appointed Certifying Surgeon under the Factory and Workshop Acts for the Newport District of the Isle of Wight.

CROWTHER, C. K., M.R.C.S., L.R.C.P. Lond., Certifying Surgeon under the Factory and Workshop Acts for the Biggleswade District of the County of Bedford.

DIVINE, J., M.D. Glasg., one of the Medical Referees under the Workmen's Compensation Act for County Court Circuit No. 16.

GRANT, A. L., M.B., Ch.B. Edin., Certifying Surgeon under the Factory and Workshop Acts for the Burghead District of the County of Elgin.

JACOBS, H. M., SIMSON, A. M., PASISH, H. J., MCNABB, J., THEUNISSEN, E. B., MUSTO, A. V. T., Resident Physicians; NICHOLSON, G., DANIEL, H. M., MOYES, T. B., VAN DYK, G., MIDDLETON, G. H., HOLMES, F., MCLEOD, N., RAUCH, J., BROWNE, F. J., Resident Surgeons; and MURE, Miss E. M., STEWART, Q., BINNIE, J. J. R., Clinical Assistants, at the Edinburgh Royal Infirmary.

JONES, J. O., Certifying Surgeon under the Factory and Workshop Acts for the Holywell district of the county of Flint.

MURRAY, J. H., M.B. Lond., Certifying Surgeon under the Factory and Workshop Acts for the Stirling District of the County of Stirling.

Vacancies.

For further information refer to the advertisement columns.

Ashton-under-Lyne District Infirmary, Lancashire.—Asst. H.S. £200.
Barrow-in-Furness, North Lonsdale Hospital.—Sec. H.S. £250.
Birkenhead Borough Hospital.—Jun. H.S. £170.
Birmingham City Hospital, West Heath.—Med. Supt. £400.
Bolton Union (Townley's Military Hospital).—Fem. Asst. M.O. £383 5*s*.
Brighton County Borough, Isolation Hospital.—Res. M.O. £300.
Brighton, Royal Sussex County Hospital.—H.P. £100.
Bristol Royal Infirmary.—H.P. and H.S. £120.
Brook War Hospital, Shooters Hill, Woolwich.—Res. M.O. £1 per diem.
Burton-on-Trent Infirmary.—H.S. £200.
Cardiff, King Edward VII.'s Hospital.—H.S. £200.
Cranbrook Union, Sandhurst Parish.—M.O. £40.
Devonport, Royal Albert Hospital.—Secretary or Hon. Secretary.
Hospital for Sick Children, Great Ormond-street, W.C.—H.S. £100.
Ipswich, County of East Suffolk.—Asst. M.O.H. £375.
London Homœopathic Hospital.—Phys. Also Phys. for Dis. of Women.
Margate, Royal Sea Bathing Hospital for Surgical Tuberculosis.—S.
National Hospital for the Paralysed and Epileptic.—Jun. H.P. £150.
Notts Education Committee.—Asst. School M.O. £400.
Prince of Wales's General Hospital, Tottenham, N.—H.P. and H.S. £250 each. Junior H.S. £200.
Rochdale Infirmary and Dispensary.—M.O.
Rochester, St. Bartholomew's Hospital.—Res. Clin. Asst. £110.
Romsley Hill Sanatorium, near Birmingham.—Temp. Med. Supt. £500.
Royal Free Hospital, Gray's Inn-road, W.C.—Two Female Surg., Asst. Anæsth., and Sen. Obst. Asst.
Royal South Hants and Southampton Hospital.—H.P. £100.
Royal Waterloo Hospital for Children and Women, S.E.—Sec. Female Res. M.O. £150.
Sheffield Royal Infirmary.—H.S. £120.
Somerset County Education Committee, Weston-super-Mare.—Sch. Oculist and Med. Insp. £450.
Swansea Education Committee.—Asst. Sch. M.O. £400.
Tottenham Education Committee.—Temp. Asst. M.O. £400.
Warrington County Borough.—Temp. Asst. M.O.H. £350.
Whitehaven and West Cumberland Infirmary.—Res. H.S. £150.
Worcestershire Asylum, Barnsley Hall, Bromsgrove.—Temp. Asst. M.O.

THE Chief Inspector of Factories, Home Office, S.W., gives notice of a vacancy for a Certifying Surgeon under the Factory and Workshop Acts at Dudley, in the county of Worcester.

Births, Marriages, and Deaths.

BIRTHS.

APPERLY.—On March 24th, at Tenby-mansions, Nottingham-street, W., the wife of Captain R. E. Apperly, R.A.M.C.T., of a son.

MACLEOD.—On March 26th the wife of Captain G. Macleod, R.A.M.C., of a daughter.

SPRIGGS.—On March 30th, at Earlhill, Banff, the wife of Edmund I. Spriggs, M.D., F.R.C.P., of a son.

MARRIAGES.

CLARK-KENNEDY—JEFFREE.—On April 1st, at St. Mary-le-Park, Battersea, Archibald Edmund Clark-Kennedy, Lieutenant, R.A.M.C., to Phyllis Grace, only child of the late Charles Howard Jeffree, and niece of Miss Jeffree, Rose Hill Cottage, Dorking.

LONGHURST—EDWARDS.—On March 26th, at All Souls, Portland-place, W., S. Herbert Longhurst, L.D.S. and L.S.A., late Captain, R.A.M.C., to Margaret Emma, daughter of Mrs. Edwards and the late Mr. George Edwards, of Dee Banks, Chester.

LYLE—ALABASTER.—On March 28th, at St. Paul's, Knightsbridge, Captain James Duncan Lyle, R.A.M.C., to Irene Violet, only daughter of Mr. and Mrs. Henry Alabaster, of "Milton," Sutton, Surrey.

THOMAS—ROWE.—On March 20th, at the Parish Church, Illogan, Major Telfer Thomas, R.A.M.C. (T.F.), to Gracie Bertha, second daughter of Mr. and Mrs. Josiah Rowe, of Camborne.

DEATHS.

DAVIS.—On March 16th, in Western Australia, Somerville Boulnois Davis, M.D.

DUNKERLEY.—Killed in action, on March 23rd, Captain Harold Dunkerley, R.A.M.C., aged 28 years.

LUKYN-WILLIAMS.—On March 27th, of wounds, H. T. Lukyn-Williams, M.B., Ch.B. Edin., temporary Captain, R.A.M.C., aged 32.

SIMPSON.—On March 31st, Captain Frederic Simpson, R.A.M.C., aged 33 years.

N.B.—A fee of 5s. is charged for the insertion of Notices of Births, Marriages, and Deaths.

Medical Diary for the ensuing Week.

SOCIETIES.

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.

Tuesday, April 9th.

OCCASIONAL LECTURES: at 5 P.M.

Professor **Marinesco** (of Bucharest): Microscope Demonstration and Lecture on the Conditions of Painful Nerves in Amputation Stumps.

Mr. **Edred M. Corner**: Communication, illustrated with the epidiascope, on Painful Nerves in Amputation Stumps with Reference to their Treatment and Results.

MEETINGS OF SECTIONS.

Monday, April 8th.

ODONTOLOGY (Hon. Secretaries—F. N. Doubleday, J. Howard Mummery): at 7.30 P.M.

Paper (adjourned from the February meeting):
Dr. Howard Mummery: Tubular Enamels.

Tuesday, April 9th.

PSYCHIATRY (Hon. Secretaries—Bernard Hart, G. F. Barnham): at 4.30 P.M.

Paper:
Dr. Ernest Jones: War Shock in its Relation to Freud's Theory of the Neuroses.

Friday, April 12th.

EPIDEMIOLOGY AND STATE MEDICINE (Hon. Secretaries—William Butler, Major Greenwood): at 5.30 P.M.

Paper:
Dr. W. J. O'Donovan: The Epidemiology of T.N.T. illness.

RÖNTGEN SOCIETY, at Burlington House, W.

TUESDAY, April 9th.—8 P.M., General Meeting. The Silvanus Thompson Memorial Lecture:—Sir Ernest Rutherford.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn Fields, W.C.

MONDAY, April 8th.—5 P.M., Museum Demonstrations in Pathology:—Mr. S. G. Shattock: I., Foreign Bodies.

The demonstrations are open to Medical Students and Practitioners. First-Aid and Ambulance Students, desirous of attending, will be admitted.

POST-GRADUATE COLLEGE, West London Hospital, Hammersmith-road, W.

Clinics each week-day at 2 P.M., Wednesday, Friday, and Saturday also at 10 A.M.

(Details of the Post-Graduate Course were given in the issue of last week.)

NORTH-EAST LONDON POST-GRADUATE COLLEGE, Prince of Wales's General Hospital, Tottenham, N. 15

MONDAY, April 8th.—2.30 P.M., Children's Diseases: Dr. T. R. Whipham. Gynæcological Diseases: Mr. F. L. Provis. Surgical Operations: Mr. E. Gillespie. 3 P.M., Medical In-patients: Dr. R. M. Leslie. 7 P.M., Venereal Clinic: Dr. Kinsella.

TUESDAY.—10 A.M., Surgical Operations: Mr. J. Howell Evans. 2.30 P.M., Medical Out-patients: Dr. A. G. Auld. Surgical Out-patients: Mr. Howell Evans. Nose, Ear, and Throat Diseases: Mr. C. H. Hayton. X Rays: Dr. Metcalfe. 3.30 P.M., Medical In-patients: Dr. A. J. Whiting.

WEDNESDAY.—2.30 P.M., Medical Out-patients: Dr. T. R. Whipham. Diseases of the Skin: The Dermatologist. Eye Diseases: Mr. A. S. Worton. Operations:—Nose, Ear, and Throat: Mr. Hayton. 4 P.M., Eyes: Mr. Worton. 5 P.M., Venereal Clinic: Mr. E. Gillespie and Mr. Benians.

THURSDAY.—2.30. P.M., Medical Out-patients, Dr. A. J. Whiting. Surgical: Mr. H. W. Carson. X Rays: Dr. Metcalfe. Gynæcological Operations: Dr. A. E. Giles. 3.30 P.M., Medical In-patients: Dr. R. M. Leslie.

FRIDAY.—2.30 P.M., Surgical Out-patients: Mr. Gillespie. Eye Diseases: Mr. A. S. Worton. 7 P.M., Venereal Clinic: Mr. E. Gillespie and Mr. Benians.

SATURDAY.—2.30 P.M., Surgical Operations: Mr. H. W. Carson.

THE THROAT HOSPITAL, Golden-square, W.

MONDAY, April 8th.—5.15 P.M., Special Demonstration of Selected Cases.

THURSDAY.—5.15 P.M., Clinical Lecture.

ROYAL INSTITUTION OF GREAT BRITAIN, Albemarle-street, Piccadilly, W. 1.

THURSDAY, April 11th.—3 P.M., Lieut.-Col. C. S. Myers, R.A.M.C.: Experimental Psychology. (Lecture I.)

FRIDAY.—5.30 P.M., Professor E. C. C. Baly: Absorption and Phosphorescence.

Mr. J. F. C. Hossack, F.R.C.S., from Honorary Associate, has been appointed Knight of Grace of the Order of the Hospital of St. John of Jerusalem in England.

EDITORIAL NOTICES.

In consequence of the pressure on our space and the shortage of paper, the Editor may be compelled to abbreviate communications, as an alternative to their rejection, when time does not allow them to be reconsidered by their authors.

Lectures, original articles, and reports should be written on one side of the paper only, *and when accompanied by blocks it is requested that the name of the author, and if possible of the article, should be written on the blocks to facilitate identification.*

We cannot prescribe or recommend practitioners.

Offices: 423, STRAND, LONDON, W.C. 2.

Communications, Letters, &c., to the Editor have been received from—

A.—Prof. F. W. Andrewes, Lond.; Mr. R. E. Artrick, Maidenhead; Armenian Red Cross and Refugee Fund, Lond.; Dr. Athill Crutwell, Bagshot; Lieut.-Col. J. G. Adami, A.D.M.S.; Dr. H. G. Adamson, Lond.

B.—Dr. G. Blacker, Lond.; Sir John Byers, Belfast; Dr. F. E. Batten, Lond.; Miss Bertha Barger, Lond.; Major J. S. Bury, R.A.M.C.; Surg. R. A. Brown, R.N.; Dr. J. M. Brown, Lond.; Mr. H. Birmingham, Goulburn.

C.—Mr. W. H. Coupland, Lancaster; Dr. A. S. Cobbledick, Lond.; Conjoint Board in Ireland, Dublin, Sec. of; Dr. H. P. Cholmeley, Forest Row; Mrs. Craig, Troon; Dr. S. Coupland, Lond.

D.—Mr. J. Dawson, Lond.; Mr. S. W. Daw, Leeds.

E.—Dr. W. A. Evelyn, York; Dr. R. Eversbed, Lond.; Mr. H. Elliot, Lond.

F.—Factories, Chief Inspector of, Lond.; Miss C. Fisher, Lond.

G.—Dr. C. W. Gittens, Cambridge; Dr. E. W. Goodall, Lond.; Dr. G. W. Goodhart, Lond.; Dr. C. Gouldesbrough, Lond.

H.—Dr. R. Howden, Newcastle-on-Tyne; Lieut.-Col. L. W. Harrison, R.A.M.C.; Dr. T. B. Hyslop, Lond.; Dr. E. Halford-Ross, Lond.

I.—Insurance Committee for the County of London.

J.—Miss M. Jones, Pangbourne.

K.—Lieut.-Col. J. Keay, R.A.M.C.

L.—Dr. C. E. Lea, Manchester; Local Government Board, Lond.; Dr. Janet Lane Claypon, Lond.; Fleet-Surg. G. M Levick, R.N.

M.—Medical Research Committee, Lond.; Mr. H. J. Morris, Sheffield; Sir Donald MacAlister, K.C.B., Edinburgh; Mr. W. Martindale, Lond.; Dr. J. C. McWalter; Ministry of National Service, Lond.; Capt. J. F. McMillan, R.A.M.C.; Mr. J. MacMunn, Lond.

N.—National Hospital for the Paralysed and Epileptic, Lond.; Dr. M. J. Nolan, Downpatrick; National Food Reform Association; New Zealand Department of Public Health, Wellington.

O.—Miss B. M. Oakley, Port Talbot.

P.—Dr. E. P. Poulton, Woldingham.

R.—Royal Institution of Great Britain, Lond.; Miss E. A. Rout, Lond.; Registrar-General, Edinburgh; Mr. W. H. C. Romanis, Lond.; Registrar-General, Dublin.

S.—Dr. H. Sutherland, Lond.; Major W. A. Stott, R.E.; Capt. S. Shepheard, R.A.M.C.(T); Société de Biologie, Paris; Dr. C. T. Scott, Market Harborough; Major S. A. Smith, D.S.O., R.A.M.C.

T.—Sir J. J. Thomson, O.M., Cambridge; Dr. C. H. Treadgold, Lond.; Dr. A. H. Thompson, Lond.

U.—University College Hospital, Lond., Sec. of.

V.—Dr. H. Vignes.

W.—Mr. A. Walker, Alnwick; Dr. F. A. Warner, Lond.; Prof. R. Wallace, Edinburgh.

MANAGER'S NOTICES.

TO SUBSCRIBERS IN THE UNITED STATES.

Messrs. Wm. Wood and Co., of New York, have relinquished their Agency for the supply of THE LANCET in the United States. The Manager of THE LANCET will be pleased to supply copies direct from the London Office to subscribers in the United States at the strictly prepaid rate of $8 for twelve months. Subscriptions may commence at any time. Drafts and Money Orders should be made payable to the Manager, Mr. CHARLES GOOD, 1, Bedford-street, Strand, London, W.C. 2, England.

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Advertisements (to ensure insertion the same week) should be delivered at the Office not later than Wednesday, accompanied by a remittance.

Notes, Short Comments, and Answers to Correspondents.

UNAUTHORISED ATTENDANCE ON PENSIONERS.

To the Editor of THE LANCET.

SIR,—Sir Matthew Nathan's letter in THE LANCET of March 23rd raises a point which practitioners should observe.

Lately a discharged soldier was sent to me with a letter from a lady interested in the local War Pensions Committee, asking me for an examination and report upon his fitness for training as an electrician, and saying she would be responsible for the fee. I examined him and gave a written opinion on his state, and advice as to further procedure. As no fee was mentioned, I in my letter requested that such fee as was thought equal to the service should be sent me. I was as a result offered 2*s.* 6*d.*!—a fee which I do not accept.

The point is that that is the value set upon such reports at present.

I am, Sir, yours faithfully,

March 25th, 1918. M.D.

COLONIAL HEALTH REPORTS.

Jamaica.—The report, signed by the Governor, Sir W. Manning, on the Blue-book for the year ended March 31st, 1917, gives the estimated population of the island on Dec. 31st, 1916, as 897,196. The birth-rate for 1916 was 33·3 per 1000 of the population and the death-rate 22·4 per 1000, as compared with 35·7 and 21·7 respectively in 1915. Of the births registered, 67·5 per 100 were illegitimate, being the highest proportion recorded since the introduction of compulsory registration in 1878. The general death-rate was increased by 0·7 per 1000. Comparing the infant mortality with the births during the year, 29,923 infants were born and 7108 died at 1 year of age or under—equal to 23·7 per cent. The percentage under 5 years was 28·3. In 71·5 per cent. of the deaths registered during the year the causes of death were not medically certified.

Yaws is reported to be still very prevalent throughout the island. The treatment of it by salvarsan was systematically carried on at the public general hospitals and in the several medical districts with beneficial results. Formerly cases of yaws had to be brought in by the district constables, but in more than one district the results of treatment by salvarsan have been so marked that patients come of their own accord and apply for treatment. During the year 2911 cases were treated, in 2677 of which the symptoms of the disease were cured. Of hookworm 5910 cases were treated at the various hospitals in the following manner: By thymol, 2807; oil of chenopodium, 1753; quassia, 1326; naphthol B. 8; eucalyptus, 16. The bacteriologist (Dr. H. H. Scott) states that in 67·93 per cent. of the specimens examined for hookworm at the General Penitentiary and the Spanish Town Prison the ankylostoma parasite was found, and that during the last 18 months, in spite of treatment, the figures show an upward tendency.

The total number of cases of malaria admitted to the hospitals was 5495. The number of cases recorded as having been caused by the so-called "vomiting sickness" during the year was 68, of which 21, or 30·8 per cent., were medically certified. A special investigation into an outbreak in Trelawny was made by the bacteriologist in the early part of the year 1917, the results of which only strengthen Dr. Scott's theory, which has been previously reported on at length, that ackee poisoning is the cause of the residuum after elimination of those accounted for by well-known diseases.[1] There was a very large increase, particularly in Kingston, in the number of cases of, and deaths from, pneumonia, the main factors in which are stated to be meteorological conditions and poverty, which combine to lower the vitality and restrict the resistive powers of the community. The possibility of a virulent strain of pneumococcus having been introduced from Halifax by home-coming convalescents of the Third Jamaica War Contingent has also been suggested as the reason for the prevalence of the disease.

The number of persons treated at the out-patients' departments of the several hospitals totalled 68,540. The number of cases admitted to public general hospitals during 1916 was 25,252. Adding the cases treated in the Kingston Public Hospital (4184), the Jubilee (Lying-in) Hospital (594), the lunatic asylum (133)), the lepers' home (141), the grand total number of patients treated in Government hospitals and asylums was 31,901, with 620 deaths. In the lepers' home on March 31st, 1916, there were 121 patients, and during the year 20 others were admitted. Eleven died, 6 were discharged, and 2 absconded.

On the food question the Governor remarks: "The high prices of imported foodstuffs, and the uncertainty as to their supply in view of the shortage of shipping and the demands of the Allies in Europe, rendered it advisable to take steps to urge the planting of ample foodstuffs in the island to render the population independent of an imported supply should there be any failure in that supply. The measures taken have ensured that if supplies from outside are obtainable in decreasing quantities there should be ample food for all, and it is stated that never before have such quantities of provisions been planted out as during the year under review. It has furthermore been generally impressed that the present situation will not be confined to the period of the war alone, but that it appears to be increasingly probable that for some time after there will be a world-wide shortage of food for man, and that supplies may be in great demand."

Dr. Scott states that contrary to belief it has been found that amœbic dysentery does exist in Jamaica to such an extent as now to be a menace. The inves-

[1] THE LANCET, 1916, ii., 70.

tigation into peripheral neuritis which was commenced towards the end of 1916 by Dr. H. W. Catto, the assistant bacteriologist, who has now resigned, was continued. Towards the end of the year a special investigation was conducted by Dr. Scott into an epidemic of a peculiar nature in Spanish Town, but he stated that it would be premature even to hazard a conjecture as to the nature of the affection at the present time, though, arguing from the symptomatic basis merely, it would appear to be an acute infective condition analogous possibly to anterior poliomyelitis.

SCRAP METAL FOR CHARITIES.

THE Edinburgh Scrap Metal Committee, organised by Councillor Stark, has collected 46 tons of scrap metal, which has been sold to local dealers for war munitions, realising £274, which have been devoted to war charities. The collection has by no means come to an end yet. The value of so-called waste material should be better realised by the public; similar committees in other centres might well be formed.

THE TERM "CAUSALGIA."

To the Editor of THE LANCET.

SIR,—Notwithstanding the courteous help of the library staff of the Royal Society of Medicine, I have been unable to ascertain exactly when or by whom the name "Causalgia" was first used. Most books seem to attribute the designation to Weir Mitchell, and, although he gave an admirable description, I have so far failed to ascertain from any of his works that he was the first user of this term. My attention has been drawn to a copy of *La Presse Médicale*, dated April 20th, 1916, wherein M. Leriche has the same regret as to the inability to find when causalgia was first named. In Mme. Athanassia-Benisty's reference to "Causalgia" in "Clinical Forms of Nerve Lesions," on page 81, the following sentence occurs:—"Causalgia was first observed in 1813 by Alex. Denmark, then by Paget, and finally by Weir Mitchell, who has given a remarkable description of it."

Perhaps some correspondent could enlighten the darkness on this little bit of medical history, and personally I should be glad to hear as to the two former authors whom she mentions, and whether either of them is entitled to the distinction of coining the word in question.

I am, Sir, yours faithfully,

Lancaster, April 2nd, 1918. W. H. COUPLAND.

"ANIMAL LIFE AND HUMAN PROGRESS."

THE last lecture of the series was delivered at King's College on March 27th, by Professor Robert Newstead, Professor of Entomology in the University of Liverpool, his subject being, "Tsetse Flies and Colonisation." The Hon. W. P. Schreiner, K.C., High Commissioner for South Africa, presided. After referring to the many ways in which insects helped or hindered the progress of man, Professor Newstead referred to the brilliant observation made by Sir Patrick Manson in 1878 that elephantiasis was transmitted by mosquitoes,[1] a discovery which had been the keynote to all subsequent discoveries in connexion with blood-sucking flies and the diseases caused by their agency. In 1908 cases of sleeping sickness were detected in Rhodesia and Nyassaland, and a few years later the Royal Society sent out a commission under Sir David Bruce which led to a revival of interest in the tsetse fly.[2] Professor Newstead than described the characteristics of the fly, and its life-history, the production of the larvæ which mature within the body of the parent, and the development of the chrysalis (or its equivalent), with lantern slides depicting the nature of the country in which the insects lived and the places they selected for breeding. Sixteen different kind of tsetse flies had been described and these might readily be divided into three groups represented by *Glossina palpalis*, *G. morsitans*, and *G. brevipalpis*. *G. palpalis* was found along river banks and occurred in belts of dense vegetation in South Africa. Beyond the denser belts of vegetation the fly did not live. In Nyassaland, miles beyond the *G. palpalis* district, the same kind of vegetation without the rivers did not harbour the fly. *G. morsitans*, on the other hand, occurred over large tracts of country and did not live in belts. One fact brought out was that the tsetse fly required a certain amount of shade for its mere existence and a liberal provision during the period of parturition. The female crawled into a shady spot under a fallen log, into the root hole of a tree, or the burrow of an animal. The fly produced a single larva at a time and at intervals of two or three weeks, probably living for about a year. Apart from man, it preyed chiefly on the larger mammals, though crocodiles and one or two other reptiles and birds also served its purpose. It had been suggested that a species of guinea-fowl might be introduced to devour the pupæ, but the lecturer did not think this proceeding would be of much use. Sleeping sickness in man was due to the trypanosoma carried by the tsetse fly, and the big game of South Africa were reputed to be the natural reservoirs of the parasites. Two types of the disease occurred, of which the newer had been established in Rhodesia. The fly and the disease which it produced formed serious barriers in the way of settlement and to the opening up of new trade routes. Specific drug treatment had proved of some value, but it appeared necessary to clear away ruthlessly the vegetation throughout the whole of the fly-infested country. Destruction merely of the breeding places and the collecting of pupæ would not, in the lecturer's opinion, cause any great diminution of the fly except in small areas. The trained experts who were sent out before the advent of the present war to investigate trypanosomiasis and its causes had shown how to combat the disease in the light of present knowledge, and great progress had been made in our knowledge of causative agents. The lecturer expressed the hope that further research would lead to an entire prevention of the disease.

[1] Dr. T. Spencer Cobbold relates Sir Patrick Manson's discovery of the intermediate host in THE LANCET, 1878, ii., 64.

[2] In the Croonian Lectures for 1915 Surgeon-General Sir David Bruce dealt with trypanosomes causing disease in man and domestic animals in Central Africa, and those of our readers interested in the subject will find a description of the tsetse flies in THE LANCET, 1915, i., 1327.

THE PREVENTION OF DENTAL DISEASE IN CHILDREN.

To the Editor of THE LANCET.

SIR,—All those who know the present condition of children's teeth must be shocked and horrified at it, but the difficulties of treatment are only realised by those who have attempted it. Years ago the writer concluded that treatment, either wholesale or retail, was almost futile so long as the cause persisted, and that the only real solution lay in prevention.

Being blessed with two healthy children and a reasonable wife it was decided to experiment with preventive measures, neither parents showing any immunity. Absolute knowledge of the ultimate causes of dental disease not being available it was also decided to act on certain assumptions, which were as follows: 1. That the disease is caused by over-feeding and meals between meals. 2. By too much manufactured sugar or sweets which exhaust the salivary glands and are the equivalent of pre-digested carbohydrates. These were not meant to be pre-digested but to be well chewed. 3. By finely milled flours in biscuits and other artificial foods. 4. By too much milk after teething, milk being designed chemically and physically for the toothless. 5. By bed-time meals, which leave the mouth unclean while the salivary glands are at rest. 6. By foods requiring too little mastication and, therefore, too little salivation. 7. By the comparative futility of the toothbrush.

Briefly, these two strong children, aged 5½ and 4, have had three meals per day (the last being 1½ hours before bed), no sweets, and milk with 50 per cent. of added water, and a small piece of an apple at bed-time for cleansing purposes. Now they habitually devour the hardest crusts of dried brown bread with relish because they have healthy appetites, powerful jaws, and perfect teeth.

Far more experiments of this sort are needed to establish the above assumptions, but it is permissible, in conclusion, to say that it is easier and cheaper to feed children on preventive lines than as they are generally treated, and also to point out that the first step towards prevention must be a determination on the part of parents to restrain themselves when they are tempted to a sentimental indulgence of their little ones in the matter of foods and sweets. Children will never miss those daugerous luxuries which they have never had.

I am, Sir, yours faithfully,

Sheffield, April 2nd, 1918. H. JAS. MORRIS, L.D.S.

R. R. L.—The account was not in THE LANCET, and appears to have been an imaginative effort which met with no official encouragement.

A. W.'s question with regard to the selection of medical officers for child-welfare work has already been dealt with in these columns.

METEOROLOGICAL READINGS.

(Taken daily at 8.30 a.m. by Steward's Instruments.)

THE LANCET Office, April 3rd, 1918.

Date.	Rain-fall.	Solar Radio in Vacuo.	Maximum Temp. Shade.	Min. Temp.	Wet Bulb.	Dry Bulb.	Remarks.
Mar. 28	...	80	52	42	45	46	Overcast
,, 29	0·20	95	47	38	36	41	Fine
,, 30	0·10	48	46	37	37	40	Cloudy
,, 31	...	99	54	41	46	50	Fine
April 1	0·12	101	56	44	48	52	Fine
,, 2	0·07	85	55	41	41	42	Cloudy
,, 3	0·05	65	55	37	42	44	Overcast

Other information which we have been accustomed to give in these "Readings" is withheld for the period of the war.